

THE EFFECTS OF VERBAL REMINDERS AND PARENTAL
CONVERSATIONAL STYLE ON LONG-TERM MEMORY IN 2-YEAR-OLDS

By

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This study examined 2-year-old children's long-term memory for an event. Several issues were of interest regarding the relation between long-term memory and language: (a) can 2-year-old children benefit from parental verbal reminders about a novel event; (b) does parental conversational style (i.e., elaborativeness) affect 2-year-old children's ability to benefit from memory talk; and (c) do children's language abilities affect their ability to verbalize about the event? Twenty-eight 24-month-old children experienced a novel event one time and returned 3 months later to verbally and behaviorally recall the event. To determine parental style, at the initial session parents engaged in memory talk with their children about novel past events. An elaboration ratio of elaborations to repetitions was calculated for each parent. Parents were classified as high elaborative or low elaborative based on their elaboration ratios.

To assess the effect of verbal reminders on children's memory, 12 children talked about the event once a month with a parent during the delay period.

There was little evidence that parental memory talk facilitated 2-year-old children's memory for the event. First, children who were reminded about the event did not have better verbal or behavioral memory for the event than children who were not reminded. Furthermore, the amount of information discussed by parents during the reminder sessions did not predict children's verbal or behavioral recall.

Second, parental conversational style did not affect children's memory for the event. Children of high elaborative parents did not evidence better memory for the event. Also, children of high elaborative parents who were reminded about the event were not better able to verbalize their memories.

Third, children's vocabulary at 24 months when the event was experienced predicted their verbalizations about the event 3 months later, and there was some evidence that children who had better language abilities at 27 months verbalized more about the event at that time. Therefore, children's language abilities when the event was experienced predicted their ability to verbalize about the event.

The results are discussed in relation to their implications for the development of autobiographical memory and representational understanding.

CHAPTER 1 INTRODUCTION

The current study examined 2-year-old children's ability to remember a one-time novel event over time. Of interest was the relation between memory and language development, specifically the extent to which children's long-term memories can be reinstated through memory talk. This issue has important implications for our understanding of the causes of infantile amnesia and for our understanding of the development of autobiographical memory. The autobiographical memory system consists of memories for personally experienced and personally relevant past events, that is those memories that tell us something about ourselves. The development of autobiographical memory during the early preschool years signals the end of childhood amnesia.

To explore the relation between memory and language in young children, twenty-eight 24-month-old children experienced a novel event one time and returned 3 months later to verbally recall and to reenact the event. Half of the children talked about the event with a parent during the 3 month delay period, and half did not talk about the event. One issue of primary interest in the current study was whether memory talk reinstates 2-year-old children's memory for events. Reinstatement occurs if children's own memory for events is activated when those events are discussed with others. If memory talk reinstates 2-year-olds' memory for events as it does 3- and 4-

year-olds' memories, children in the present study who are verbally reminded about the event during the delay period should have better memories for the event than children who are not reminded. Additionally, since parental conversational style has been shown to affect the elaborativeness of children's event memories (Fivush, 1991), the present study examined whether the effectiveness of verbal reminders is related to the elaborativeness of parental conversational style during memory talk. The present study provides additional information regarding young children's ability to benefit from memory talk about a specific event.

Theories of Infantile Amnesia

Although there is considerable individual variability, it is generally accepted that most adults have difficulty reporting events experienced before the third or fourth year of life (Kihlstrom & Harackiewicz, 1982; Sheingold & Tenney, 1982). This phenomenon has come to be known as childhood or infantile amnesia. Memories occurring prior to age 3 are typically not recalled, whereas memories occurring after age 3 are more easily retrieved, with retrieval improving between the ages of 3 and 5 (Waldfoegel, 1948; Wetzler & Sweeney, 1986). Kihlstrom and Harackiewicz (1982) found that, on average, adults' earliest memories were reported around the age of 3.5 years, and Sheingold and Tenney (1982) found that college age students who had experienced the birth of a sibling when they were at least 3 years could remember that event later, but they could not remember the birth of a sibling if it occurred prior to age 3.

The inability to recall events occurring during the first few years of life has ramifications for how we view memory development and, more generally, cognitive development. One important issue is whether memory can be conceptualized as continuous or discontinuous, that is whether the memory systems of infants and young children are qualitatively similar or dissimilar to that of older children and adults. Research supporting the infantile amnesia phenomenon indicates that there are qualitative differences in the memory systems of individuals at different ages. A variety of theoretical explanations have been proposed to account for infantile amnesia (see Pillemer & White, 1989, for a review). Pillemer and White (1989) have classified these into several broad classes of theories. Among the earliest and most well-known theories of infantile amnesia is the Freudian idea of repression; memories for childhood events exist but are actively repressed because they are linked to unacceptable childhood sexual and aggressive impulses (i.e., blockade theory) (Pillemer & White, 1989).

A second view is related to cognitive developmental changes in the memory system (see Nelson, 1993; Pillemer & White, 1989, for a review of these theories). One explanation is that very young children are incapable of forming memories during this period of time, and this is why there are few, if any, memories from this time period. A second explanation is that because very young children lack the cognitive abilities to construct narrative memories, memories encoded in the first few years later become inaccessible over time (Pillemer & White, 1989; Wetzler & Sweeney, 1986).

A third view is that infantile amnesia occurs as a result of an inability to reconstruct the traces from early memories. According to this view, autobiographical memories undergo reconstructive processes as they are continually retrieved, such that memories are reinterpreted in terms of the individual's present knowledge. The latter explanation, proposed by Schachtel (1947) and Neisser (1962, 1967), holds that amnesia for early events is the result of reorganization of children's mental structures, necessitated by social demands on the child to become responsible, reality-oriented, and reliant on language. This process results in mental representations or memories that are incompatible with earlier structures, rendering early memories inaccessible.

Although these theories have tried to account for childhood amnesia, empirical evidence provides support for none of them. First, in recent years it has become more apparent that adults can remember events from early childhood (Sheingold & Tenney, 1982). Second, there is evidence that very young children are capable of forming memories during early childhood. Therefore, it is not the case that young children are incapable of forming memories. For instance, DeLoache and her colleagues (DeLoache & Brown, 1979; DeLoache, Cassidy, & Brown, 1985) have demonstrated that even 2-year-olds can remember the location of stuffed toys that they observed being hidden in a room the day before. Furthermore, there is growing evidence that young children can, under some circumstances, remember events occurring before the age of 3, and in some cases, before the age of 1. Some of the earliest evidence documenting early memory was reported by Todd and Perlmutter (1980), in which 3-year-olds recalled naturally occurring events up to 8 months

earlier, and 4-year-olds recalled events occurring 15 months earlier. Fivush, Gray, and Fromhoff (1987) also found that 29- to 35-month-old children could recall information from events that had occurred at least 6 months earlier, prior to the age of 2. Similarly, Fivush and Hamond (1990) found that 4-year-olds recalled as much information about going to Disney World when they were 2.5 as they had when they were first questioned about the event nearly 2 years earlier. Therefore, the traditional accounts cannot adequately account for or explain this phenomenon.

The fact that events occurring in the second year of life can be remembered at much later points in time raises a number of questions. For instance, if toddlers and preschoolers can recall events experienced as much as a year earlier, why are these memories apparently lost later in life? Also, how long can early memories be retained, and what factors affect retention?

To answer some of these questions, Nelson (1988, 1989, 1992) and Pillemer and White (1989) have proposed alternative explanations of infantile amnesia that examine how social factors affect the development of autobiographical memory. According to Nelson's social-functional approach (1989, 1993), the most general function of memory is to guide present actions and to predict future outcomes based on the past. For this reason, younger children are much more likely to remember more routine types of events than specific events because they allow children to understand their world and to make predictions about future occurrences (Hudson & Nelson, 1986). Therefore, one-time events would have little predictive value, would be of little use in guiding actions, and thus would be dropped from memory after a

period of time. They may be retained for shorter periods of time, sometimes as long as several months (Hudson, 1990b), but they are not accessible later in life.

However, if the event is reminded or reexperienced, it is more likely to be retained.

The implication of this argument is that reminders determine whether experiences will be retained for a longer period of time (see also Fivush & Hamond, 1989; Hudson, 1991a).

Several researchers emphasize the role of social factors, such as memory talk, in the development of the autobiographical memory system. For instance, Nelson (1989, 1992) argues that as children become older, they begin to retain memories for their personal significance rather than simply for their predictive value because they understand the social value of talking about the past. Fivush (1988) argues that this development, the development of the autobiographical memory system, is related to the development of an enduring concept of self. She argues that although very young children have long-term memories of the past (e.g., Fivush et al., 1987), those memories become inaccessible over time unless they somehow are integrated into the child's self-concept. Over time, children learn how to interpret memories in terms of themselves (i.e., why the event was important and what it tells them about themselves). Both researchers believe, however, that memory talk (i.e., conversations about past events) is an important tool for the formation of durable long lasting autobiographical memories. At some point during the preschool years, memory talk begins to reinstate children's memory for events. That is, conversations with others about past events begin to remind children of their memories for those events,

assuming that children have acquired the verbal skill necessary to communicate or represent their memories (Nelson, 1993) or that they have acquired the ability to direct their own memory search (Hudson, 1990b). For reinstatement to occur, Nelson argues that children must be able to use the verbal representation of another person to remind themselves of their own memories for that event. This also entails understanding that someone else's memory of the event is different from their own. According to Nelson, the representational abilities necessary for reinstatement are not acquired until the late preschool years. On the other hand, Fivush and Hamond (1989) argue that reinstatement is contingent on the ability to form coherent narrativized versions of their experiences. Because younger children lack the language skills necessary for this, Fivush's argument is that memory talk may not reinstate memories in children younger than 2.5.

Although no research has directly examined when memory talk first reinstates children's memory for events, the consequence of these more recent theories has been an increased focus on the development of autobiographical memories and the factors that influence the retention and duration of early memories. One way that this has been investigated is through examination of both adults' and children's ability to recall events and experiences from their first years of life (see Howe & Courage, 1993; Pillemer & White, 1989, for reviews). To examine whether and how memory talk affects 2-year-old children's memory for a novel event, the present study examined three factors thought to affect long-term retention of early memories and the formation of autobiographical memories: (a) verbal reminders (i.e., memory talk) about a

specific event; (b) parental conversational style; and (c) children's language development. Each of these factors will be addressed in more detail in the following sections.

Literature Review

For preschool children, memories for events have generally been examined using naturally occurring events or laboratory-derived events. In such cases, children simply are asked to report on what they remember about an event (Fivush, 1984). With children younger than 3, different methods, such as naturalistic observation, in the form of diary studies and home observation, or elicited/deferred imitation, have typically been used. The earliest studies employing naturalistic methods, such as diary studies (Ashmead & Perlmutter, 1980; Nelson & Ross, 1980) and home observations (Todd & Perlmutter, 1980), found some anecdotal evidence that 3- and 4-year-olds can remember early events. Todd and Perlmutter (1980) cite one 3-year-old who made a reference to the chocolate- and honey-flavored milk that her mother gave her as a baby. Similarly, Nelson and Ross (1980) noted one child who remembered the name of a friend when driving by the friend's house after a period of months had passed. Even more striking was the fact that the child had been unable to say the friend's name when his family relocated. Although such reports are encouraging, we cannot conclude that young children are able to verbalize about specific past occurrences since such reports may simply represent more general types of memories for what usually happens (Pillemer & White, 1989).

More recent studies have provided more convincing evidence that children can remember specific events over time. Fivush and her colleagues (Fivush, Hudson, & Nelson, 1984; Hudson & Fivush, 1991) revealed, in a series of studies, that kindergartners could accurately recall a trip to an archaeological museum up to 6 years later, given specific questions and appropriate cues, such as pictures. Additionally, Fivush and Hamond (1990) compared children's recall at 2.5 years to their recall for the same events at age 4 and found that 4-year-olds could recall as much information about the previously recalled events at age 4 as at age 2. Furthermore, in some situations, age and retention interval do not seem to influence the overall amount of information that can be recalled about a novel event by young preschoolers (Hamond & Fivush, 1991).

Deferred imitation tasks, like those used by Bauer and her colleagues (Bauer & Mandler, 1989; Bauer & Shore, 1987), have found that children as young as 14 to 16 months can remember the temporal and causal relations of action sequences experienced only one time up to 6 weeks later. In elicited imitation, an experimenter uses props to model an action or sequence of actions. Following the modeling procedure, the props are given to the child who is encouraged to imitate the sequence that was demonstrated by the experimenter. Children's production of target actions and sequences immediately following modeling provides a measure of immediate recall, whereas production of target actions and sequences after some specified amount of time provides a measure of delayed recall or deferred imitation (Bauer, Hertsgaard, & Dow, 1994). Much of the research which has demonstrated memory for events in

children younger than 2 has used the elicited imitation paradigm. This paradigm is considered by many to be an acceptable alternative to cued verbal recall because the conditions surrounding learning and testing provide no evidence that children's behavior at testing is the result of anything but recall (Bauer & Wewerka, 1995a). Using this paradigm, Meltzoff (1988) also has demonstrated that 14-month-old children can recall action sequences following a delay of 1 week. Similarly Bauer et al. (1994) have shown that 13-month-olds can retain information about temporal order for periods of 1 week, and Bauer and Mandler (1989) and Bauer and Shore (1987) have shown that 20-month-olds can reenact action sequences after periods of 2 to 6 weeks. Bauer, Hertsgaard, and Wewerka (in press) further demonstrated that 13- to 20-month-old children could "recall" specific events, that is events experienced only one time, when they were given appropriate verbal reminders to aid retrieval (e.g., "You can make a windmill with that stuff. Show me how to make a windmill.").

Using another paradigm to investigate long-term memory, Myers, Clifton, and Clarkson (1987) report that 3-year-old children who had participated in a study of auditory space when they were 6 to 40 weeks old showed some evidence of retention for the action sequences 2 years later, in the form of willingness to remain in the study and number of reaches for the target object. However, with one exception, children did not use words to relate this early experience. Perris, Myers, and Clifton (1990) replicated the Myers et al. (1987) study using a sample of 6.5-month-old children and a variable retention interval. Children experienced a novel auditory event (a special rattle) one time and returned either 1 or 2 years later. Children who

returned after 1 year reached in the dark for the rattle more often than controls and reached more than children returning after 2 years, and even children who returned 2 years later reached for and grasped the rattle significantly more often than same-age control children.

Although these studies suggest that even very young children can remember events substantially later in time, they do not demonstrate that children's earliest event memories take a narrative form or that children can even verbalize about them. Such studies also raise the distinction between implicit and explicit memory. Some researchers (see Pillemer & White, 1989; Schacter, 1993; Squire, Knowlton, & Musen, 1993) argue for the existence of two distinct memory systems. Implicit memory is generally thought to be present from birth, with such memories being unavailable for conscious reflection and not consciously encoded. Implicit memories include knowledge for procedures and simple recognition. On the other hand, explicit memory is thought to develop later (see Pillemer & White, 1989), with brain maturation. The time at which the explicit memory system is considered functional is still very controversial, with some researchers arguing for its existence as early as the first few months of life (Mandler, 1984) and others arguing that it is not functional until the second year of life (Pillemer & White, 1989). Explicit memories differ from implicit memories in that they are subject to conscious reflection.

This is an important distinction to make because much of the research examining long-term memory for infant and early childhood experiences has used behavioral measures such as reaching, grasping, or willingness to stay in a darkened

environment, implicit measures of memory (Myers et al., 1987; Perris et al., 1990).

The clearest evidence that young children might have explicit memories for early events comes from the work of Bauer and her colleagues (1994) and Meltzoff (1988) which have used the elicited imitation methodology (although see Nelson, 1994).

Here it is argued that the elicited imitation paradigm is a suitable nonverbal alternative to verbal recall (i.e., explicit memory) because (a) it measures memory for a brief, often one-time exposure and therefore cannot be procedural memory; (b) it is unlikely that infants' behavior is the result of priming or reinstatement of a previously acquired response; and (c) reenactment of action sequences cannot be accounted for by recognition because the sequences are not perceptually obvious from the available props (Bauer et al., 1994).

Language and Its Relation to Long-Term Memory

Research examining children's verbal memories for events has provided the best account of how memories develop and change during early childhood. One primary research objective has been to find evidence of memory for specific events occurring prior to the development of language. Such research would address the structure of the memory system in younger children, and more specifically the developing autobiographical memory system. One argument is that the reason older children and adults have difficulty remembering events from before the age of 3 is that memories for early events were never formed or were formed in such a way that they are irretrievable at later periods. Such accounts purport that the memory systems of younger and older children are not the same and that the memory process is not a

continuous one (see Pillemer & White, 1989). By examining children's verbal memories for events occurring before the age of 3, it is possible to gather more information concerning whether specific memories can be recalled over time. To date, however, very little empirical research has demonstrated or tried to demonstrate that children can verbalize about preverbally experienced events. Finding that early nonverbal memories can be translated into more adult-like narrative forms at a later point would provide support for the continuity of cognitive development, that is, for the idea that all early memories are not lost with time but that some change form or are updated to remain accessible (i.e., translated from more implicit/procedural forms to more explicit/declarative forms, although see Mandler, 1984, regarding this distinction).

Although most research examining young children's ability to verbalize about early occurring events is anecdotal in nature, several studies do provide limited support that children can do so. For instance, Boyer, Barron, and Farrar (1994) found several instances in which 3-year-olds spontaneously reported information about the color of the laboratory room or information about the toys (color, parts) that were present, as part of an event memory study occurring when they were 20-months-old. However, this information was related outside of the context of the event—on the way to the lab or getting ready to go back to the lab and not as responses to specific questions. Furthermore, it is not the case that the information reported was stressed at the time of the initial study nor is it likely that children encoded the names of the colors at the time the event was experienced. Rather it seems that this information

became more verbally accessible as children became more linguistically competent and experienced.

Additionally, in the Boyer et al. (1994) study, many children anticipated some of the actions and described what they were doing as they reenacted the event. One child, upon entering the room, went directly to one of the props and said, "push this down and the spaghetti comes out" (pp. 441), while manipulating the lever and pointing to where the play-doh spaghetti should appear. At another point, he picked up an object and said, "you need this and you put the spaghetti in this" (pp. 441). In total, 24 of the 37 children who returned 1 to 2 years after the original event either anticipated verbally a behavior that was to be performed or labelled the behavior as they were performing it. It may be that even if young children are unable to construct narrative reports of previous events on demand, they may be able to verbally recall or anticipate some aspects of the event when adequate retrieval cues are provided (see also Farrar & Goodman, 1992; Fivush, 1991, for similar arguments).

In the auditory space study, Myers et al. (1987) also report an instance in which a 3-year-old child spontaneously recalled information about an event that had occurred 2 years earlier, when instructed to "guess" what was behind the picture. However, for the most part, they found that children were unable to verbalize about these early experiences.

More recently, Bauer and Wewerka (1995a, 1995b) also have examined children's ability to verbalize about a previously experienced series of activities. They were particularly interested in whether an increased ability to verbally encode the

event (as determined by a productive vocabulary index) would facilitate 1- to 2-year-old children's ability to access or retain events over a long period of time. Measures of children's productive vocabulary taken when 13-, 16-, and 20-month-old children first experienced the activities were correlated with children's memory verbalizations about the event 1-3, 6, 9, or 12 months later, and action reenactment was correlated with the ability to talk about the event in context. They conclude that children's ability to verbally encode the activities when they were experienced predicted children's ability to verbally recall them at a later point. However, memory was not contingent on verbal encoding. For instance, although there was a relatively low correlation between early language and later behavioral recall, children with limited verbal ability nevertheless remembered the activities. In sum, this research suggests that the ability to verbally encode the activities when they are experienced is not necessary for the event to be remembered over the long term or for later verbal expression of the memory. However, verbal elaboration does appear to facilitate memory.

In a follow-up to the first study (Bauer & Wewerka, 1995b), children who were 20 months when the activities were first experienced returned again when they were 36- to 40-months old, approximately 8 months after the first delay session. The procedure was essentially the same as in Bauer and Wewerka (1995a), with the exception that verbal reports about the target events were elicited prior to the opportunity for reenactment. For each activity, the experimenter held the props in front of her, beyond the child's reach, and asked the child to verbally describe the

objects and the activity surrounding them. Children were encouraged with general prompts such as "what else did we do?" and "and then what did we do?" Once children either had completed their description of the actions necessary to produce the event or appeared unable to do so, the experimenter handed the props to the child and reminded the child of the target event: "We made an X with these. Show me how we made an X." When compared to same-age control children, returning children generated labels for 54 of the 108 possible activities (12 children, 9 events each); 70% of the generated labels were correct. Control children, although equally likely to generate labels for the events, only labeled 24% correctly, suggesting that returning children were relying on their memories for labels for the activities and were not simply guessing.

Returning children also were more likely to recall activities, props, and attributes that were relevant to the activities than were control children. The amount of information provided during the first assessment (Bauer & Wewerka, 1995a) predicted the amount of information recalled during the second assessment 8 months later. Overall language ability at the time the activities were experienced and encoded (as measured by reported productive vocabulary) predicted children's ability to verbalize about the event much later; very young children were able not only to behaviorally indicate what they remembered about the past, but also to verbally express what they remembered when familiar props and context were available.

However, in the Bauer and Wewerka research, it is not clear how many children actually talked and how many and what components were verbally recalled by

the children. Nevertheless, children were able to provide verbal reports of their memories of the activities even though they were not specifically prompted to do so. Even the youngest children produced spontaneous verbal reports of the event.

Other research also suggests that young children can verbalize about their early memories. Fivush et al. (1987) found that even 29- and 35-month-old children could verbally recall specific, novel events that were experienced in the recent past (up to 3 months ago) or distant past (more than 3 months ago) before the age of 2.

Furthermore, all children were able to recount at least one event that had occurred in the distant past, and they were able to recall as much accurate, organized information about events in the distant past as about more recent events. Such instances of long-term recall suggest that memories can be stored and retained for several months, without the availability of a fully functional language system and that, in certain instances, "language can be later superimposed on previously encoded preverbal memories" (Nelson & Ross, 1980, p. 96).

Although there is some evidence that children can spontaneously update their early memories to a verbal form, there is no explanation as to why some memories are translated and others are not. It is not the case that all early memories are expressible verbally. In support of this latter contention, Boyer et al. (1994) found that none of the 3-year-old children who had participated in their play-doh event 1 to 2 years earlier responded to general questions about the event or to pictures or questions regarding the objects used or actions performed in the event, prior to reexperiencing it, although some of the children had experienced the event multiple

times at 20 months. Therefore, children could not provide an independent narrative account of the event although it was expressible behaviorally. Also, very little research has examined what happens to those memories over time once they are initially recalled verbally.

The effect of memory talk on memory. One popular method of studying children's verbal memories for events has been memory talk. By engaging young children in conversations about past events, it has been possible to examine how conversations about the same event change over time (e.g., content, consistency), the duration of event memories, at what point children become active participants in conversations about the past, the effect of parental elaborativeness during these conversations on children's subsequent memories for these events, and how children respond to different interviewers.

One theory that has been proposed to account for the relation between memory talk and memory development is the social construction model. According to this model, children learn how to remember, not what to remember, from conversations with others about past events. This theory grew out of the Vygotskian framework (Vygotsky, 1978) which maintains that all higher mental abilities are the result of social interactions. These social interactions provide children with the necessary "tools" for thought. Over time, it is thought that children internalize these tools for personal use. Thus, much of cognitive development, in this case memory, can be conceptualized as resulting from collaboration between children and adults, who are more cognitively skilled.

Researchers such as Nelson, Fivush, and Hudson have attempted to account for the development of autobiographical memory using the social construction model, which maintains that autobiographical memories are formed through social interaction. Through conversations about the past with their children, parents teach their children how to remember and why it is important to remember the past. When adults first begin to engage their children in memory talk, they provide narrative structure as well as content information about the event. With experience, children begin to internalize this structure and the skills for remembering and narrating events and to provide more of the content on their own during these conversations. By the age of 3 to 4, they generally are capable of producing independent narratives.

There is evidence that supports the social construction model. First, Eisenberg (1985) proposed that children develop linguistic forms for memory talk by engaging in conversations with others. In one study, she monitored the language development of two children from the time they were 18 months until they were 36 months. She identified three phases that children pass through in learning how to talk about the past. In the first phase, adults provide the content and structure of these conversations, requiring that children simply respond with a "yes" or "no" to participate. With time, however, children begin to contribute memory information and to become more active participants in these conversations, eventually initiating conversations on their own. In another study, McCabe and Peterson (1991) found that children's ability to provide a coherent narrative at 42 months was related to how their parents structured earlier conversations at 27 and 31 months.

Furthermore, past research with parent-child memory talk has found evidence for the existence of two different parental conversational styles of talking about the past (Fivush & Fromhoff, 1988) and has found that style differences affect the development of autobiographical memory (Fivush, 1991; Fivush & Fromhoff, 1988; Hudson, 1990b; McCabe & Peterson, 1991; Reese & Fivush, 1993; Reese, Haden, & Fivush, 1993). These styles have typically been distinguished by the types of questions asked and the amount of contextual support and elaboration provided within the conversation. Elaborative (or high elaborative) parents talk about the past more often with their children and ask fewer questions (most of them open-ended), while at the same time providing their children with many details about the event being discussed. They often continue to question their children about an event by providing additional details with each question until the entire event has been discussed. This style is illustrated in an example from Reese and Fivush (1993), in which a parent and child are discussing a trip to the aquarium (p. 606). Although this child contributes very little information, the parent continues to provide additional information:

- P: Did we see any big fishes? What kind of big fishes?
 C: Big, big, big.
 P: And what's their names?
 C: I don't know.
 P: You remember the names of the fishes. What we called them. Michael's favorite kind of fish. Big, ugly fish.
 C: Yeah.
 P: What kind is it?
 C: um, ba.
 P: A ss shark?
 C: Yeah.
 P: Remember the sharks?
 C: Yeah.

P: Do you? What else did we see in the big tank at the aquarium?

C: I don't know.

P: Remember when we first came in, remember when we first came in the aquarium? And we looked down and there were a whole bunch of birdies in the water? Remember the names of the birdies?

C: Ducks!

P: Nooo! They weren't ducks. They had on little suits. Penguins. Remember what did the penguins do?

C: I don't know.

P: You don't remember?

C: No.

P: Remember them jumping off the rocks and swimming in the water?

C: Yeah.

P: Real fast. You were watching them jump in the water, hm?

C: Yeah.

On the other hand, characteristics of repetitive (or low elaborative) parents include (a) asking repetitive questions without providing many details; (b) topic switching; (c) asking simple yes-no questions; and (d) pursuing one specific answer.

P: How did we get to Florida, do you remember?

C: Yes.

P: How did we get there? What did we do? You remember?

C: Yeah.

P: You want to sit up here on my lap?

C: No.

P: Oh, Okay. Remember when we went to Florida, how did we get there? We went in the _____?

C: The ocean.

P: Well, be-, when we got to Florida we went to the ocean, that's right, but how did we get down to Florida? Did we drive our car?

C: Yes.

P: No, think again, I don't think we drove to Florida. How did we get down there, remember, we took a great big _____? Do you remember? (Reese & Fivush, 1993, p. 606)

Stated differently, parents who use a more elaborative style tend to emphasize the where, when, why, and how of an event, whereas parents who are more repetitive and less elaborative emphasize the who and what (Bauer & Wewerka, 1995a).

Importantly, research has consistently demonstrated that parents who are more elaborative and provide more information have children who later recall more information and construct more elaborate narratives themselves (Hudson, 1990b; Fivush, 1991; McCabe & Peterson, 1991; Reese & Fivush, 1993; Reese et al., 1993). For instance, Fivush (1991) examined the effect of mother-child conversations about the past on the development of narrative abilities for those same events. Specifically, she examined whether the amount of information that mothers provide about past events in their conversations influences the amount of information that 2.5-year-old children later provide and whether mothers' narrative organization during early conversations affects children's later verbal organization of an event. She found no evidence that the amount of information mothers provided influenced the amount of information that children could later recall about an event. However, she did find a relation between the amount of information that mothers provided per conversational turn (i.e., narrative density) and the amount of information per turn that children were later able to provide.

Also, it is not the case that children of more elaborative parents are simply recalling the information provided by their parents in the earlier conversations (rote learning). Rather it seems that more elaborative parents are teaching their children what information is important to include in memory narratives and how to structure

memory narratives. They may also be providing their children with subtle messages regarding the social value of reminiscing about the past (Fivush, 1991; Nelson, 1989, 1993). For instance, parents who provide considerable information about the past during memory talk may convey to their children that memory of one's past is important.

Interestingly, all parents demonstrate characteristics of both styles when engaged in talk about the past with their children. However, parental differences are most evident when children indicate a willingness to continue the conversation, such as responding to a yes-no question or repeating after the parent, without providing memory information. In this case, elaborative parents are more likely to provide additional information, and repetitive parents either repeat the same question or switch to a new topic. When children provide information or do not respond, no parental differences are evident.

Although research on parental style differences in memory talk emphasizes the role of social factors in the development of autobiographical memory, little research has examined the role that children may have in eliciting a particular interactional style from the parent. That is, this effect may also be bidirectional (Barron, 1994). Not only may parents be influencing how children learn to think about events by the interactional style they use, but children may also be influencing the style that their parents use when they talk to them. For instance, McCabe and Peterson (1991) argue that the relation between children's discourse skills at 27 months and parental language

style at 42 months was the result of parents fine-tuning their talk to best suit their children's abilities, or what they believed to be their children's abilities.

On the other hand, although Reese and Fivush (1993) found that maternal elaborativeness during memory talk was related to children's responses at each of four time points, there was very little evidence that children's responses during earlier interactions affected mothers' level of elaboration for any of the conversations. However, it is possible that children who are more interested in social interaction than others are more likely to elicit an elaborative style (Barron, 1994; Fivush & Reese, 1992) and that children who are highly impulsive, active, or easily distracted may elicit more directive speech from parents, resulting in a more repetitive parental style. It is also possible that the language abilities of children may affect parental style although attempts to establish a relation between language skill and maternal conversational style have not been informative. For instance, Hudson and Sidoti (1988, as cited in Hudson, 1990b) found no relation between maternal style and the mean length of utterance (MLU) of 24- and 30-month-old children. Also, Reese et al. (1993) concluded that children's language ability was not related to maternal style because they found no relation between 40-month-old children's MLU and maternal style. However, it is still possible that children's ability to initiate a conversation and to maintain a topic may affect parents' perceptions of their children's language and cognitive skills, and these perceptions may be reflected in how they talk about the past with their children (Barron, 1994; see also McCabe & Peterson, 1991). Therefore, one possibility is that parents of children who are more linguistically competent try

harder to elicit responses from their children by providing more content and additional details to help their children.

Not only do social construction theorists advocate the importance of memory talk for the development of narrative skills, but they propose that memory talk about events also reinstates memory for events over time (Nelson, 1992). This idea, borrowed from research with physical reactivation (Rovee-Collier & Hayne, 1987), suggests that memory for an event is strengthened each time the event is discussed. In general, the reactivation model considers the effects of experience more broadly and has typically used physical reactivation to demonstrate the effect of experience. According to this view, it is not necessary for an event to be reexperienced in its entirety; rather, the information that is reexperienced activates additional memory, and the entire memory is strengthened (see also Sheffield & Hudson, 1994). From an information-processing perspective, recall of an event memory may activate nodes and paths in a semantic network and strengthen them in memory. Those nodes and paths that develop through reactivation make the memory more accessible to additional reactivation over time. Consequently, events that have been recalled or reactivated more frequently are more accessible to later recall because there are more and stronger available paths to facilitate retrieval of information. Furthermore, nodes of information that are activated just by thinking about the event are also strengthened. Therefore, repeated experience with an event strengthens memory and extends the length of time that a memory will be accessible (see Hudson 1990b, for a complete description).

Research examining physical reactivation supports the contention that the more often an event is experienced or part of it is reexperienced, the more memorable that event becomes and the more resistant to forgetting (e.g., Bauer et al., 1994; Boyer & Farrar, 1995; Farrar & Boyer, 1995; Hudson, 1990a, 1991a). Most of the support for this particular model comes from research by Rovee-Collier and her colleagues (Rovee-Collier & Hayne, 1987), which examined infant memory using the mobile conjugate reinforcement paradigm. Using this paradigm, 3-month-old infants can remember a novel event, making a mobile move, up to 4 weeks later if they are reminded using reactivation.

Simply reexperiencing an event once can also facilitate memory. Rovee-Collier and Hayne (1987) demonstrated that a learned behavior can be strengthened and retained for longer periods of time if infants are reexposed to the original context prior to when forgetting occurs. Similar effects also have been found for older children (Fivush & Hamond, 1989; Sheffield & Hudson, 1994). For instance, Fivush and Hamond (1989) found that physical reinstatement facilitates 24- and 28-month-old children's memory for a novel event. In this particular study, children participated in a novel event one time. Then, half of the children returned 2 weeks later to reexperience the event. All children returned 3 months later to reenact the event. Children having repeated experience with the event performed better 3 months later than children having only a single experience, indicating that reinstatement in the form of additional experience facilitates long-term memory.

Crucial for the success of physical reactivation is the amount of time that has passed since the event was last experienced. Rovee-Collier and Hayne (1987) and Hudson and Sheffield (1993) argue that reactivation is time-window dependent and that reminders are most effective when they are presented close to the point of forgetting; this length of time is age-dependent because children remember for longer intervals as they grow older. Hudson and Sheffield (1993) found that 18-month-old children who reenacted an event either 2 or 8 weeks later recalled more event components 2 months later than children who reenacted the event immediately after it was originally experienced. Furthermore, 8 to 12 months later, children who had reenacted the event 2 weeks after the event recalled more activities than children who had reenacted the event immediately after it occurred.

Verbal reinstatement and its relation to long-term memory. More recently, it has been proposed that memory talk about events can reinstate children's memory for events (Nelson, 1992). Research examining physical reactivation supports the contention that the more often an event is experienced or part of it is reexperienced, the more memorable that event becomes and the more resistant to forgetting (e.g., Bauer et al., 1994; Boyer & Farrar, 1995; Farrar & Boyer, 1995; Hudson, 1990a, 1991a). One way that early memories may remain accessible is through verbal reinstatement using memory talk. Whereas Rovee-Collier and Hayne (1987) argue that it is theoretically possible to keep a memory alive through periodic reexperience with the event, it may be that memory talk or verbal reinstatement can also act to make the translation of memories from child form to adult form more likely.

Whereas Nelson (1993) has argued that children cannot use language as a means to reinstate memory until the age of 4, both Fivush and Hamond (1989) and Hudson (1993) believe that this may occur earlier. According to Hudson (1990b, 1993), memory talk is likely to reinstate young children's memories when they can participate in conversations about past events, some time between the ages of 2 and 3 years. She found that 24- and 30-month-old children's repeated conversations with their mothers affected their recall with an experimenter, such that events that had been discussed with the mother were more readily discussed with the experimenter than new events. However, prior discussions with the mother did not increase the amount of information that children provided when talking with the experimenter; that is, children did not incorporate information the mothers provided into their own accounts. She concludes that memory talk may affect 2-year-olds' memory differently than preschoolers' because 2-year-olds do not remember more about events that have previously been discussed. Rather, she argues that memory talk does facilitate memory for events but that the effect is more general, for instance, affecting children's ability to contribute information during memory conversations. In her study, children more readily discussed events that had been discussed than events that had not been discussed, but repeated conversations did not affect the amount of information that they verbally recalled.

According to Nelson, an event that is discussed during memory talk is more likely to be remembered at a later point or to be incorporated into the autobiographical memory system than an event that is not discussed. However, whereas researchers

examining the effects of physical reactivation can document the effectiveness of additional experience in infants as young as 3 months, there is currently some debate regarding when memory talk or verbal reinstatement becomes an effective means of extending the duration of early childhood memories. Additionally, less is known about verbal reinstatement in general, for instance whether verbal reinstatement also is time-window dependent and if verbal reinstatement and physical reactivation operate within the same time frames.

In sum, to date the dominant theory explaining young children's memory development is the social construction model because of its developmental emphasis on how children learn to think and talk about the past as a function of environmental/social factors. Although there is some discussion of how memory talk reinstates memory (cognitive factors), there is little empirical research to support this. Because so little research has examined verbal reinstatement, it is unknown whether verbal reminders function in the same manner as physical reminders and whether young children benefit from them.

Summary

To date despite the fact that most adults are unable to remember events occurring prior to age 3, a number of studies have demonstrated that, at least during childhood, very young children do retain memories of novel events over relatively extended periods of time. Amount of experience with the event and the amount of time that has passed since the event was experienced or reinstated have been identified as important variables which affect the retention and ultimate recall of early event

memories. The ability to use language competently may also be a prerequisite skill for permanent long-term memories (Nelson, 1989), but the relation between language and memory, including the contribution of parental conversational style, is not well understood. Although anecdotal evidence indicates that children can remember events experienced while they are preverbal or transitional, few laboratory studies have examined children's ability to verbally recall events occurring prior to the onset of language or mature narrative abilities, and none have investigated the role of verbal reminders in young children's verbal and behavioral memory. The age at which children can benefit from verbal reminders about events has implications for the development of autobiographical memory.

Description of the Current Study

The current study addressed several issues regarding the relation between long-term memory and language: (a) can 2-year-old children benefit from verbal reminders about a novel event; (b) does parental conversational style (i.e., elaborativeness) affect the extent to which 2-year-old children benefit from memory talk; and (c) do children's language abilities affect their ability to remember, and more specifically to verbalize about the event?

The goal of the present study was to examine more specifically how language affects young children's memory for events. As an extension to the social construction model, it was proposed that talking about an event serves several functions for children: (a) it teaches children how to think about events and remember them; (b) it reactivates memory for the event so that the memory remains accessible

for longer periods of time, making it easier for children either to independently recall it in the future or to recall it with someone else; and (c) it models narratives about events so that children can better express their memories using the correct labels, temporal order, and descriptions for the more novel components. One partial explanation for why children may have difficulty talking about events experienced preverbally, except in rare instances, is that they do not have experience mapping language onto those memories. Many memories that children do spontaneously update linguistically have some significance for them or may have been reactivated at some point after they became more linguistically competent, making it easier for those memories to be translated to more mature and enduring forms.

Although hypotheses have been proposed regarding the potential relation between language and memory, little research has been done to support them, with the exception of research examining memory talk and the development of narratives. In the current study, verbal reminders, in the form of parent-child memory talk about a novel event, were used to examine this relation and the claim that children younger than 3 or 4 do not benefit from verbal reminders.

In the present study, twenty-eight 24-month-old children engaged in a moderately complex, novel event. Half of the children (12) were randomly assigned to a verbal reminder condition in which they talked about the event once a month with the same parent across a 3-month delay interval. Parents of the remaining children (16) were instructed not to talk to their children about the event (no reminder

condition). Three months later, children returned to the laboratory to verbally and behaviorally reenact the event.

The present study is the first to examine the effect of memory talk and parental conversational style on young 2-year-olds' long-term memory for a novel event and to examine the claims about reinstatement set forth by other researchers. Nelson (1993) argues that if memory talk functions as rehearsal only, repeated conversations should strengthen memory only for those components that are discussed, and children should begin to incorporate information discussed previously into their own accounts. Research with older preschoolers indicates that repeated conversations do not rehearse specific memories but that children recall new information at consecutive sessions and do not incorporate information provided by their mothers into their own accounts (Fivush & Hamond, 1990; Fivush, Hamond, Harsch, Singer, & Wolf, 1991; Hudson, 1990b).

Although Hudson (1993) examined memory talk in 24- to 30-month-olds and also found that young children do not incorporate information provided by their parents into their own memories of an event, the present study differs from that research in several important ways. First, in that research the mean age of children at the time the events were first discussed was 27 months. Therefore, the age of the children in the present study is somewhat younger. Second, parents discussed naturally occurring events with their children for the measure of memory talk. Thus, there was very little control over which events were discussed because all children experienced different events. Also, there was little control over when the events were

experienced as long as half of them had been experienced in the recent past (1 to 6 months previously) or in the remote past (6 to 10 months previously). Therefore, some of the events were discussed as soon as 1 month after they were experienced, and others were not discussed until 6 or 10 months later. There was also no way to determine whether and how often parents had already discussed these events with their children prior to the study. In the present study, all children experienced the same event in the same way at the same age. There was also more control over circumstances surrounding the event and memory talk about the event. For instance, parents of children in the reminder condition were instructed not to discuss the event with their children except during designated times, and other parents were instructed not to discuss the event with their children during the delay period at all. Therefore, there was more control over whether the event was discussed and how often it was discussed.

The present study further differs from previous research because it examines long-term effects of memory talk on young children's memory for the event. Memory for the event was assessed 3 months after the event was experienced allowing for the examination of long-term effects of memory talk on children's memory. Also, the present study allowed for an assessment of the effect of memory talk independent of children's verbalizations about the event. Past research with memory talk has used children's verbalizations during memory talk as the primary measure of children's memory. However, in the present study, it was possible to examine behavioral memory for the event, in addition to verbal recall, to assess the effect of verbal

reminders on children's memory. Finally, the present study allowed for an examination of the relation between children's language skills and their ability to verbalize about the event and to benefit from verbal reminders about the event.

The current study also controls for problems of novelty, complexity, and maturation that have plagued other studies which have used laboratory events to examine young children's long-term event memory. Specifically, maturation problems have existed because an event that is age-appropriate for younger children becomes too easy for them over time, thus making it difficult to determine if performance is attributable to memory. One way to control for this potential problem is to create an event that is novel for both younger and older children by using objects in a way that would not be obvious to older children (Meltzoff, 1988). The current study utilized activity names and both common and uncommon objects that 2-year-olds would find interesting and not too familiar. Additionally, some more common objects were used in ways that were not typical of how children would ordinarily use them or see them used (e.g., painting with combs).

Hypotheses. Several patterns of results regarding children's ability to benefit from verbal reminders and to verbally and behaviorally recall the event were possible. First, if 2-year-old children benefit from verbal reminders about a novel event, 2-year-old children who talked about the event with the parent should verbally report and reenact more of the event than children who did not. However, if verbal reminders do not affect 2-year-olds' memory, children in both the reminder and no reminder conditions should perform comparably 3 months later. Such a finding would provide

support for Nelson's theory that 2-year-olds cannot use language to represent or to reinstate an event because they lack the representational abilities necessary to do so.

However, because memory talk research has not examined the relation between memory talk and behavioral recall, even if verbal reminders affect 2-year-olds' memory, it was not known whether verbal reminders also would affect their behavioral memory for the event. For instance, if verbal reminders only affect children's verbal expression of the event, behavioral recall should not differ between the two groups, since presumably all children would have experienced the event the same way. On the other hand, if memory talk reinstates memory, children in the verbal reminder condition should also have better behavioral recall of the event than other children, since presumably their memory for the event would have been activated and strengthened each time the event was discussed.

Second, studies with preschoolers have shown that parental conversational style affects children's ability to verbalize about the event; children of more elaborative parents have more elaborate verbal memories of events than children of low elaborative parents. If parental conversational style affects 2-year-olds' memory as it does preschoolers', children of high elaborative parents should have more elaborate verbal memories for the event than children of low elaborative parents.

Third, it has been proposed that children's ability to verbalize about event memories is a function of their current language abilities and the amount of experience that children have verbalizing about the event, and the inability to verbalize about memories is not the result entirely of retrieval deficits (Mandler, 1990). If children

simply have difficulty expressing themselves because they have not talked about a specific experience, talking about the event with the parent after it occurs should help children formulate ways to verbally express their memories and increase the likelihood that they will report more novel aspects of the event or that their verbal recall will correspond to their behavioral recall. Also, it would be expected that children having more sophisticated language and narrative skills would be better able to verbally describe their memories.

The examination of whether children's language abilities are related to their ability to verbalize their memories has important implications for infantile amnesia. It is possible that verbal memory is contingent on verbal skills and that children who have more sophisticated language skills are the ones who provide verbal accounts of their memories. Such a finding would suggest that the verbal translation of early memories is dependent on exposure to the verbal form of that event. One implication then is that many early memories become irretrievable because they were not translated to more verbal forms.

CHAPTER 2 METHOD

Participants

Twenty-eight 24-month-old children (14 females and 14 males) participated in the current study ($M = 24$ months, 7 days on the first visit; range = 23 months, 3 days - 25 months, 11 days). There were 8 males and 4 females in the verbal reminder condition and 6 males and 10 females in the no reminder condition. Children were recruited from an existing pool of volunteer parents who had responded to advertisements or solicitations. The majority of the children and parents who participated were white, middle-class residents of a small, university-affiliated community.

Eight additional 27-month-old children (5 girls, 3 boys; $M = 27$ months, 0 days; range = 26 months, 26 days - 27 months, 4 days) were recruited as controls in order to assess the validity of performance during reenactment at the memory session.

An additional 12 children were recruited but were not included in the final sample. Five children (1 from the no verbal reminder condition and 4 from the verbal reminder condition) participated in the first session or the first two sessions but did not return to complete the final session--four were too busy, and one had moved. A sixth child, who participated in the no verbal reminder condition, was not included in the final sample because he did not speak English. A seventh child, who participated

in the verbal reminder condition, was not included in the final sample due to uncooperativeness. The remaining five children were in the verbal reminder condition and participated in all sessions but were not included in the final sample because of problems with the verbal reminder sessions. One parent lost her child's tape after making the recordings, one parent taped over the memory talk conversations, for two parents, the verbal reminder sessions were not recorded, and one child destroyed the tape.

Design

Half of the children were randomly assigned to the verbal reminder condition (12), and half (16) were assigned to the no verbal reminder condition prior to the first session. All parents were asked to return with their children 3 months later for verbal and behavioral recall. Parental conversational style of talking about the past was determined at the time of the first session.

Event

The event was a moderately complex set of four activities organized around a central theme of "making pictures." Table 2-1 provides a description of the event. The length of the event was similar to the overall number of activities that researchers have typically used with young children. Each individual activity within the event consisted of three actions, making each activity approximately the same length as

Table 2-1
Making Pictures Event

Preliminary action: put on art smock

Activity 1: "make a glue picture"

- a) squeeze colored glue on paper plate
- b) fold plate in half and press
- c) glue on colored construction paper shapes

Activity 2: "make a collage"

- a) put paper clips on edge of paper
- b) roll stamp on paper
- c) glue straws on paper

Activity 3: "do sand art"

- a) remove "sticky paper" from clear shoe box container
- b) sprinkle colored sand with salt shakers onto sticky paper
- c) prop picture on easel

Activity 4: "paint a picture"

- a) add glitter to paint dishes
- b) dip comb in paint and paint on paper
- c) dip sponge shapes in paint and paint on paper

Closing actions: take off art smock and get a sticker

individual activities used in elicited and deferred imitation studies with young children. All children experienced the event the same way with a trained research assistant to prevent differences in the way that the event was experienced.

Procedure

All children participated in three laboratory sessions over a 3 to 4 month period of time: (a) the initial visit when the event was experienced; (b) a verbal recall session 3 months later ($M = 3$ months, 7 days delay); and (c) a behavioral recall session 3.5 months later ($M = 3$ months, 21 days delay). The behavioral recall and verbal recall sessions were scheduled 2 weeks apart to avoid interference of verbal recall with behavioral recall or participant fatigue. The verbal recall session always occurred first so that the objects and actions from behavioral recall would not affect verbal recall.

Session 1. Children's first visit occurred when they were 24 months old.

Following a warm-up play session to establish rapport, all children participated in the event with a research assistant in an adjoining laboratory room. The event was 15 to 20 minutes in length and required children to be active participants. One parent was present in the room to increase the child's comfort level. A chair was provided in the room so that parents could watch unobtrusively. Parents were instructed not to prompt specific actions; however, they were allowed to encourage their children to follow the experimenter's instructions.

Following the event, parents and children returned to the first room. To assess parental conversational style, parents were asked to talk to their children about two or

three novel one-time events that had occurred within the past several months. Parents and children either sat on the floor or sat on a couch to talk. Topics that parents could discuss with children were limited to one-time events that lasted no more than one day. They were asked to avoid discussing routine events or those that were extended in time, such as an extended vacation. Also, they were asked to discuss events that they had personally experienced with their children and to avoid talk of unshared events. The experimenter instructed parents to discuss the events with their children as they normally would discuss past events at home. No restrictions were placed on the amount of time that parents were to talk. Parents were instructed to indicate when they were finished talking to their children. After providing the parent with instructions, the experimenter left the parent and child alone in the room with some books. Conversations were audiotaped for purposes of later analysis.

Parents of children in the verbal reminder condition were further instructed to talk about the target event with their children at this time. The initial conversation between the child and the parent provided an indication of the child's initial ability to engage in talk about the event and provided an account of all event-related information discussed by parents (i.e., reminded). This was considered to be the first reminder session.

Because it was thought that children's own language abilities would affect the way that the event was encoded and children's subsequent ability to verbalize about the event, parents also were asked to complete the MacArthur Communicative Development Inventory for toddlers (CDI) (Fenson et al., 1993). This instrument is

appropriate for assessing productive vocabulary, words children say, in children aged 16 to 30 months. The inventory consisted of a checklist of 680 vocabulary terms from 22 different categories (e.g., animals, body parts, descriptors). Parents were asked to indicate the terms their children produced by checking off the appropriate words. This instrument has been externally validated through comparison with observational measures (e.g., Bates, Bretherton, & Snyder, 1988; Bretherton, McNew, Snyder, & Bates, 1983; Fenson et al., 1994) and is considered to be an accurate assessment of the linguistic abilities of young children (Bretherton et al., 1983). An estimate of each child's productive vocabulary was obtained by counting the number of words that parents indicated their children currently produced.

To assess the impact of verbal reminders on 2-year-old children's long-term memory for the target event, at the close of the session parents of children in the verbal reminder condition were provided with an audiotape and asked to discuss the event with their children once a month in their home as if it were any other event that they would discuss during periods of reminiscing. To ensure that all parents in this condition engaged their children in monthly conversations about the event, parents received a reminder phone call each month (after one month and two months) prior to the time that the event was to be discussed. At this time, parents also were reminded about the activities and props from the event. Conversations between children and parents were audiotaped. Parents of children in the verbal reminder condition were asked not to talk to their children about the event except during the designated times.

Parents of children in the no verbal reminder condition were asked not to talk to their children about the event by initiating or encouraging such conversations.

Finally, to control for out-of-lab intervening experience, all parents were asked not to engage their children in any activity that was similar in nature to the activities of the event. They were also provided with forms to record any event-related verbal utterances or behaviors that their children made or initiated during the 3-month delay interval. Because only one parent indicated that her child evidenced memory for the event outside of the lab, this measure will not be further addressed.

Five female experimenters conducted the initial sessions with the children at 24 months and were aware of children's assignment to a reminder condition. However, because parental style was determined using information calculated during the first sessions, all experimenters were unaware of parents' conversational style.

Session 2. The second session occurred at the lab 3 to 3.5 months after the first session, when children were 27 months old. The purpose of this session was to determine if children could verbalize about the target event after an extended delay and to get an updated account of children's verbal abilities. After rapport had been established using picture books, children were interviewed by an experimenter about the "making pictures" event, using a core set of general and specific questions (e.g., "Can you tell me how we made pictures before?" "Tell me how we made the glue picture." "Did you use colored glue?"). All children were asked about all four activities. This interview also served as a verbal reminder about the event for all children.

Following the verbal interview, the experimenter left the room, and children and parents participated in a 5-minute play session that was used to assess children's MLU at 27 months. Parents were instructed to play with their children as they normally would at home. Parents and children were provided with a box of Fisher Price airport toys to facilitate play and conversation. These sessions were videotaped and later transcribed for purposes of analysis.

Finally, parents once again completed the vocabulary inventory by indicating the words that their children currently produced. Parents of children in the verbal reminder condition returned their verbal reminder audiotapes at this time.

Session 3. All children and parents returned to the lab approximately 2 weeks following the verbal interview to reenact the event. At this time, all parents also returned any records that were kept regarding their children's memory for the event. The purpose of this session was to determine if children would evidence behavioral memory for the target event. After the experimenter had established rapport with the children, they were taken back into the laboratory playroom and asked to demonstrate how to make the pictures they had made on their first visit. Children were encouraged to look around the room at all of the activity stations and to make pictures as they had before. The arrangement of the room was the same. Children's behavioral recall and verbal recall were assessed at this time. Parents were present but were instructed not to cue or prompt their children in any way. All cuing or prompting was done by the experimenter using general memory probes (e.g., "What did we do to make pictures before?") and prompts (e.g., "How did we make this

picture?" or "Do you need to do anything else?") (see Boyer et al., 1994). In general, specific behaviors were not prompted. Exceptions were made if children became frustrated because they did not know how to use a particular object. Actions performed as the result of a specific prompt were excluded from analysis (e.g., if child used the glue bottle correctly after being shown), but actions performed following the performance of a prompted action were not excluded, for instance if the child folded the plate after the experimenter showed her how to use the glue bottle.

Control children participated in an equivalent session. After rapport had been established, control children were told that they were going to go to a different room where they would be able to make pictures. Children were then taken into the laboratory room and given the opportunity to explore and to engage in any of the activities. The arrangement of the room was the same. Children were encouraged to examine objects at each of the four tables and to play with the toys as they liked. All target behaviors occurring within a 15 to 20 minute period of time or until children indicated boredom or unwillingness to cooperate were scored.

Four of the same experimenters and three additional experimenters conducted the second and third sessions. When possible, the same experimenter conducted both session 2 and session 3 for the same child to increase the child's comfort level. To prevent experimenter bias effects, only the primary investigator knew children's assignment to a reminder condition. Experimenters were not told of a child's assignment to a reminder condition prior to that child's follow-up sessions, and in many cases, a different experimenter conducted the first session and the follow-up

sessions. Also, the primary investigator made reminder phone calls to parents of children in the reminder condition and scheduled all of the follow-up sessions so that the remaining experimenters would be unaware of children's assignment to a reminder condition.

Scoring

Children's linguistic ability. To determine the complexity of children's language abilities, specifically the extent to which they would be able to narrate about an event or to elaborate on an event (Bauer & Wewerka, 1995a), children's productive vocabulary as determined by parental report on the vocabulary inventory from the first and second sessions was scored by counting the total number of words that each parent indicated his or her child produced (possible range = 0 to 680). Additionally, children's utterances during the parent-child play session from session 2 were scored for mean length of utterance (MLU) by dividing the total number of morphemes produced by the total number of utterances children made in that period of time. A morpheme was defined as the smallest unit of analysis, such as an individual word or word endings (e.g., cat = 1 morpheme, cats = cat + s = 2 morphemes). Mean length of utterance provides an indication of the complexity of sentences being used by a child at a particular time and was used in the present study to determine the complexity of children's narrative abilities at 27 months.

Parental style. All tapes were transcribed verbatim, according to the guidelines of the CHILDES system (MacWhinney & Snow, 1990). Transcripts were then scored according to the following coding schemes.

It was hypothesized that parental conversational style, specifically the elaborativeness with which parents talked to their children about past events, would affect children's long-term memory for events. To classify parental style, all parent-child conversations occurring during the first session were transcribed. As with Reese and Fivush (1993), the beginning and ending of each conversation about each event was determined. Because some parents talked about fewer than three events or more than three events, only the first two conversations about events provided by each parent that fit the criteria were scored. Past research examining parent-child conversations about the past has required that children provide at least two codable unique pieces of information during each event conversation to be included. However, because children in the present study were younger than children in other studies and thus less verbal, and because the primary interest was in parental conversational style rather than children's ability to contribute to conversations, this was not a requirement in the current study. Excluded from analysis were routine events (e.g., going to the store), those that had a storyline, such as movies (e.g., the Lion King movie), or events that lasted more than one day (e.g., an extended family vacation). Exceptions to this were made if parents talked about a portion of a vacation (e.g., getting on the airplane to go see Grandma) or if they talked about going to a movie when it was a unique experience and the storyline was not discussed. For purposes of the current study, talk of the child's 2-year birthday, Christmas (e.g., Christmas day or going to see Santa Claus), and Halloween was not excluded

because it was not likely that such events would be confusable in time for 2-year-olds although such events have been excluded in studies of older preschoolers.

Parental utterances were scored according to the following categories (Reese & Fivush, 1993; Reese et al., 1993). The coding units for most types of utterance codes were independent clauses, with each unique or implied verb constituting a new proposition (Barron, 1994; Reese & Fivush, 1993). Although only a few utterance types, specifically repetitions and elaborations, were important for the current study, coding was exhaustive, with all codes being mutually exclusive.

1. elaborations: utterances which structured conversation by focusing on a new aspect of the event or adding additional information. Elaborations took the form of questions or statements.

2. repetitions: questions or statements which repeated the gist or the exact content of previously mentioned information. An utterance was scored as a repetition only if it provided no new information about the event under discussion.

3. information requests: any who, what, where, when, and why questions that requested specific information about the event (e.g., "Who came with us to Disney World?").

4. clarifications: utterances which required the child to provide acoustical clarification and generally took the form of a question (e.g., "you did what?" or "huh?").

5. memory prompts: questions or statements that requested additional information from the child without providing any new information (e.g., "do you remember?" and "tell me about it.").

6. yes-no questions: questions which required the child to provide affirmative or negative response (e.g., "Was Sally there?"). For the purpose of the present study, questions fit this categorization if the information presented in the questions was not new information. If new information was presented, the question was scored as an elaboration.

7. evaluations: utterances which commented on the accuracy of the child's previous statement or confirmed the child's statement (e.g., "that's right." or "very good."). Evaluations were coded by instance of occurrence and limited to one per conversational turn since parents tended to provide evaluations in succession (e.g., "that's right. very good.").

8. associative talk: utterances that were related to the event being discussed but not specifically about it. Such utterances took the form of future talk, fantasy talk, or general information about the event under discussion. Associative talk was coded by instance of occurrence and limited to one per conversational turn.

9. metamemory comments: comments that referred to the process of remembering (e.g., "you probably don't remember that because it was so long ago.").

10. off-topic talk: comments that were not related to the event under discussion (e.g., "we'll go to the store when we are done talking.").

Each proposition was considered to be a separate codable unit, even if it occurred in the same conversational turn with another proposition. Utterances containing tag questions were not considered to be questions and were scored as statements (e.g., "We went to Disney World, didn't we?"). Additionally, "statements," that is utterances that do not take the standard form of a question, were scored as questions if they functioned as such, that is if the intonation of the utterance was question-like and the child either was expected to respond, as determined by at least a 2-second pause, or if the child did respond as if it were a question. A 2-second pause is the established amount of time that a child has after a question has been asked to answer a question without being credited with a "no response" (Reese & Fivush, 1993). Therefore, if the parent provided an utterance and paused for at least this period of time, this was assumed to imply a question and was scored as such. Additionally, parental repetitions of children's previous utterances were scored as questions if they sounded like questions, that is followed a question-like intonation pattern. Based on these scores, an elaboration ratio score (the measure of parental style) was calculated for each parent-child dyad by dividing the total number of elaborations provided across the scorable conversations by the total number of repetitions used in those same conversations (Barron, 1994).

Parent target event codes. Parents' conversations with their children about the target event (session 1 and reminder conversations) were scored for content information. Each unique unit of information discussed about the event was scored: (a) activity--any of the activities in the event (4 possible); (b) prop--any of the props

directly related to the event (17 possible); (c) action--any of the actions related to the activities (12 possible); and (d) setting and related information--any information pertaining to the building or room where the event took place or to the circumstances surrounding participation in the event (14 possible). It was possible for an utterance to contain multiple units of information. Content was scored independently for each of the three conversations and also summed across the three conversations to obtain an overall account of information discussed at least once (overall content).

Consistency measures were calculated using content information. In general, consistency was scored by summing the number of overlapping units of information discussed in consecutive conversations, divided by the total number of unique units of information produced in the two conversations (Hudson, 1991b). A score of 1.00 indicated that the information provided across conversations was identical, and a score of 0 indicated that there was no overlap (Hudson, 1991b).

Two different consistency scores were calculated using the content information obtained from parents. First, an overall consistency score for each parent was derived. This measure provided an account of how often the same units of information were discussed by parents on each of the three conversations during the 3-month delay interval. Also, consistency measures were used to examine the relation between the information that was recalled by children at different sessions and the information previously discussed by parents. In this case, the parent measure was overall content.

The total number of unique event-related units of information discussed by parents across the three conversations comprised the compilation score (i.e., this was the same as the sum of overall content). This score was used to determine how many pieces of information about the event were discussed by the parent at least one time in the 3-month delay period.

Child target event codes. To determine the extent to which children in the reminder group contributed to conversations about the target event, children's responses were scored according to the following categories:

1. no response--children did not respond. A no response was scored if the child did not respond to a parent's question within 2 seconds of its being asked.
2. response--children responded to the question but did not provide new memory information. Some examples of responses included memory placeholders ("I don't know."), evaluations (answering "yes" or "no" to a question), and unintelligible utterances as part of an appropriate conversational turn.
3. memory response--children provided new information about the event in response to a question (usually a memory prompt or request for information).
4. offers of information--children provided new information spontaneously or in response to a general prompt (i.e., not in response to a specific question) (Fivush & Fromhoff, 1988).

All children's memory responses and offers of information about the target event at session 2 and session 3 also were scored for content, using the same protocol described for parents. For the reminder children, a compilation score was derived to

determine how much of the event (total number of unique pieces of event-related information) was recalled by each child across all verbal reminder sessions. To examine the extent to which children incorporated information provided by the parent during the reminder sessions into their own recall, consistency scores were calculated, as described earlier, for the percentage of parental contributions that were repeated by children in later sessions (Hudson, 1991b).

The purpose of session 2 was to determine the extent to which children could verbalize about the target event after 3 months had passed. Children were interviewed by an experimenter regarding the specifics of the target event. The content of children's recall about the target event was scored for event-related units of information. Children's "yes" responses to yes-no questions asked by the experimenter were not scored as memory responses unless children were able to provide additional information about the event.

Behavioral memory codes. The purpose of session 3 was to determine whether children could behaviorally recall the target event after an extended period of time. There was also the opportunity to assess event-related verbalizations made by children while engaging in the event. If 2-year-olds are able to verbalize about a previously experienced event, it was expected that they would be more likely to verbalize about the target event in the presence of the objects (in context) than in a different context (session 2) when contextual support was minimal.

Children's reenactment of the event was scored for (a) total number of actions performed and content, and (b) correct sequencing of target actions within each of the

four activities (see also Boyer et al., 1994; Boyer & Farrar, 1995). For sequencing scores, only the first occurrence of each target action was scored in order to prevent artificial inflating of temporal sequencing resulting from chance or trial and error. As with similar studies, the number of actions recalled is known to affect the production of correctly sequenced pairs of actions, rendering the two dependent measures not completely independent of one another.

For sequencing, children were given credit for correct performance of a pair of actions if sequencing approximated the event's order (see Boyer et al., 1994; Boyer & Farrar, 1995). There were eight possible pairs that could be sequenced, with each of the four activities having two possible pairs of actions that could be sequenced. This measure allowed children to receive credit for correct sequencing without being penalized for omitting an action. If children repeated an action or performed two actions out of order, credit was only given for the first occurrence of the action or not given at all.

Children's verbalizations during behavioral recall were of two types: (a) verbalizations indicative of memory for the event (mnemonic); and (b) verbalizations not indicative of memory for the event (nonmnemonic) (Bauer & Wewerka, 1995a). To be of the first type, the child needed to (a) ask a question or make a statement regarding a nonobvious target action, (b) verbally anticipate a target behavior with or without performing the accompanying action, or (c) request an unseen target object or action (e.g., Where is the ...?). The second category included verbal behaviors wherein children (a) labeled a perceptually available obvious object; (b) labeled or

commented on a nontarget action that they could perform or were performing with an available object; (c) made a general request or comment; (d) immediately repeated something the experimenter had said, even if it was event-related; or (e) made an irrelevant comment.

Reliability

For each coding scheme, at least two coders established reliability. For parental style, one coder scored all transcripts for parental style, and a second coder independently scored approximately 20% of the transcripts (6). Reliability between the two coders was 84%.

Reliability was also established for information discussed during the verbal reminder sessions by children and their parents and for children's performance during the behavioral recall session. For information discussed by parents and children during the reminder sessions, one coder scored all of the verbal reminder sessions, and a second coder scored all sessions for three of the children (25%). Reliability for information discussed by parents was 88%, and reliability for information recalled by children was 88%. Because contributions by children were so low, this number represented one disagreement.

For behavioral recall, one coder scored all of the behavioral recall tapes, and a second coder scored approximately 20% (6). The percentage of agreement for number of actions recalled was 100% and for actions sequenced was 95%.

CHAPTER 3

RESULTS

Analyses were conducted to address the following issues regarding the relation between long-term memory and language: (a) can 2-year-old children benefit from verbal reminders about a novel event; (b) does parental conversational style (i.e., elaborativeness) affect 2-year-old children's ability to benefit from memory talk; and (c) do children's language abilities affect their ability to remember, and more specifically to verbalize about the event? Parental style will be discussed first, followed by the results for behavioral recall and verbal recall.

Parental Style

In general, parental style was calculated from the first two events discussed at session 1 that fit the designated criteria. For six parents, style was classified using only one novel event; five parents talked about only one event that fit the criteria, and one other parent in the verbal reminder condition only talked about the target event.

The elaboration ratio was determined by dividing the number of elaborations provided during these conversations by the number of repetitions provided. An elaboration ratio of 1.50 was used to classify parents as high elaborative or low elaborative; this score fell at approximately the median point when all scores were ranked from lowest to highest. Past research has used either a median split (Barron, 1994) or a set value to assign parental style classification (Hudson, 1993; Reese et al.,

1993). Reese et al. (1993) used a set value of 1.00 to classify parental conversational style. In the present study, an elaboration ratio of 1.50 indicates that high elaborative parents used at least 50% more elaborations than repetitions in the present study.

The average elaboration ratio was 1.81 (range: .07 - 7.25); fifteen parents were classified as low elaborative ($M = 0.80$), and 13 were classified as high elaborative ($M = 2.98$). The average elaboration ratio for the reminder condition was 2.35 and for the no reminder condition was 1.42. Although children were randomly assigned to a reminder children prior to determining style, parents of children in the reminder condition were more elaborative than parents of children in the no verbal reminder condition. However, this difference was not significant, $F(1, 26) = 2.24$, $p > .05$, and resulted from a few extremely high elaborative scores in the reminder group and because there were more low elaborative than high elaborative parents in the no reminder condition. Five parents of children in the reminder condition were classified as low elaborative ($M = 0.58$), and seven parents were classified as high elaborative ($M = 3.61$). In the no reminder condition, 10 parents were classified as low elaborative ($M = 0.92$), and 6 parents were classified as high elaborative ($M = 2.25$). There was no significant difference between the reminder-low elaborative and no reminder-low elaborative groups or between the reminder-high elaborative and no reminder-high elaborative groups, $ps > .05$. These differences between the groups were not considered extreme enough to affect the outcome of any of the analyses, particularly since many of the analyses also examined general effects of parental style as a continuous variable.

Comparison of Groups for Behavioral Recall

This section consists of three different sets of analyses: (a) analyses of variance to examine group differences for behavioral recall; (b) correlational analyses to examine the relation of language and parental style to behavioral recall for all children and for children in the reminder condition; and (c) consistency measures to examine the relation between information discussed during the reminder sessions and children's behavioral recall.

To assess the effect of verbal reminders and parental conversational style on behavioral recall (action recall and sequencing), children's behavioral recall was analyzed in two 2 (Parental style: high elaborative vs. low elaborative) x 2 (Reminder condition: verbal reminder vs. no verbal reminder) between-subjects analyses of variance. There were no significant effects for reminder condition (reminder condition: $M = 6.00$ actions, 2.25 pairs; no reminder condition: $M = 6.06$ actions, 2.13 pairs) or for parental style (high elaborative: $M = 5.42$ actions, 1.87 pairs; low elaborative: $M = 6.57$ actions, 2.47 pairs) for number of actions performed (12 possible) or for number of actions sequenced (8 possible), $ps > .05$. See Tables 3-1 and 3-2 for the number of actions recalled and sequenced.

An additional comparison of same-age control children (8) to experimental children (30) was analyzed in a one-way analysis of variance to ensure that experimental children's performance was attributable to memory. These results show that experimental children remembered the event after a 3 month delay and were not simply "figuring out" the event. Experimental children performed significantly more

Table 3-1
Actions Performed by Children

	Elaborativeness					
	High			Low		
Reminder condition	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
Reminder	5.57	2.47	7	6.60	2.97	5
No reminder	5.25	1.08	6	6.55	1.26	10

Note. The maximum number of actions that could be recalled was 12.

actions than control children, $F(1, 34) = 26.84$, $p < .01$ (control group: $\bar{M} = 2.25$ actions; range: 0.0 - 4.0 actions; experimental group: $\bar{M} = 6.03$; range: 2.0 - 9.5 actions) and sequenced the event significantly better than the control group, $F(1, 34) = 28.80$, $p < .01$ (control group: $\bar{M} = 0.13$ pairs; range = 0 - 1 pairs; experimental group: $\bar{M} = 2.18$; range = 1 - 4 pairs). In sum, although parental style and verbal reminders did not facilitate behavioral recall of the event, there was evidence that experimental children were remembering the event 3 months later, when compared to naive children.

Table 3-2
Pairs of Actions Correctly Sequenced by Children

Reminder condition	Elaborativeness					
	High			Low		
	M	SD	N	M	SD	N
Reminder	2.14	.90	7	2.40	1.34	5
No reminder	1.50	.55	6	2.50	1.18	10

Note. The maximum number of pairs that could be sequenced was 8-- 2 pairs for each of the 4 activities.

Overall relation of language and style to behavioral recall. Although there were no significant group effects, correlational analyses were carried out to detect any patterns of responses or behaviors that were not apparent in the analyses of variance. Because parental style is thought to have a general effect on memory, it is possible that children of high elaborative parents may have more elaborate memories for events than children of low elaborative parents, even for events that have not been discussed with others. For children in both the reminder and no reminder groups, correlations were used to examine the relation between behavioral recall at session 3 and parental style at session 1. Caution should be used in interpreting the following correlations

given the number of correlations that are reported and the small sample size of some of the groups.

There was no relation between behavioral recall and parental style, $r(26) = -.20$, $p > .05$, indicating that parental elaborativeness did not facilitate or affect behavioral memory for the event. Furthermore, vocabulary at session 1 and session 2 was not related to behavioral recall, $r(26) = .05$ and $.07$, $ps > .05$, respectively. Therefore, neither parental style nor children's language abilities predicted children's behavioral memory for the event at 27 months.

Relation of language and style to behavioral recall for the reminder group.

Although there were no significant differences between the reminder and no reminder groups, indicating that verbal reminders did not facilitate behavioral recall, it was still possible that repeated conversations about the event were affecting what information children in the verbal reminder condition recalled. The following correlations were conducted to examine further the relation between verbal reminders and children's behavioral recall: (a) children's behavioral recall with parental style; (b) children's behavioral recall with vocabulary at 24 months and 27 months; (c) amount of information discussed by parents during the reminder sessions (using the parent compilation score) with information behaviorally recalled by children; and (d) amount of information recalled by children during the reminder sessions (using the child compilation score) with information behaviorally recalled by them.

First, regarding the relation between parental style and behavioral recall, there was not a significant relation for the reminder children, $r(10) = -.21$, $p > .05$.

Second, vocabulary at 24 months did not predict behavioral recall, $r(10) = -.09$, $p > .05$, and vocabulary at 27 months when children recalled the event did not predict behavioral recall, $r(10) = -.14$, $p > .05$. Therefore, there was no relation between parental style or children's language skills and children's ability to behaviorally recall the event.

To examine whether the reminder conversations affected children's behavioral recall, the total amount of information discussed by each parent was correlated with children's behavioral recall. A compilation score was derived for each parent to reflect the total number of event-related units that were discussed during the three reminder conversations (e.g., setting information--"we went to the University a long time ago," activities--"you made a glue picture," props--"there was colored sand in salt shakers," and actions--"you put the glue on the plate"). The mean number of units discussed across all conversations was 20 (range: 7-29); parents with lower scores may also have been talking about the same information each time rather than incorporating new information on subsequent conversations. Although the correlation between the amount of information discussed by parents during the reminder sessions and behavioral recall was not significant, $r(10) = .31$, $p > .05$, this correlation was in the expected direction, indicating that increased exposure to information during the reminder sessions may facilitate behavioral recall.

The relation between the amount of information recalled by children during the verbal reminder sessions was also correlated with children's behavioral recall at 27 months. A compilation score was derived for each child to reflect the total number of

event-related units that were discussed during the three reminder conversations, as described earlier. The mean number of units discussed across all conversations was 1.5 (range: 0 - 5). Eight of the 12 children in the reminder group recalled information during the verbal reminder sessions. There was a tendency for children who contributed more information during the reminder sessions to behaviorally recall more information, $r(10) = .43, p > .05$.

Consistency of behavioral recall with reminded information. In order to determine whether children in the reminder group were behaviorally recalling information discussed earlier either by parents or themselves, consistency scores were computed for (a) information discussed by parents during the verbal reminder sessions and behavioral recall at session 3; and (b) information recalled by children during the verbal reminder sessions and behavioral recall at session 3. For two children, consistency scores did not include information discussed from session 1; for one parent, this conversation was not recorded, and for the second parent, the conversation about the target event was omitted from session 1. For all other parents, consistency was calculated between session 1 and the 1-month conversation and between the 1-month conversation and the 2-month conversation. Overall consistency (i.e., information provided at all three sessions) was .30 (range: 0.00 to 1.00). Therefore, in general, parents did not provide their children with the same information each time they talked about the event with their children.

Also, it is important to note that children's consistency across the verbal reminder sessions was very low. Only five children talked on more than one session,

and four children did not contribute any information during these discussions. Eighteen units of information (e.g., props, action, activities) were contributed by children during these conversations. Of the eight children who contributed information, 58% of the information that was provided had been previously mentioned by parents at an earlier session. Therefore, children were recalling some units of information that had been reminded at least 1 month earlier.

Regarding the relation between what was discussed by parents and behaviorally recalled by children, consistency ranged from 0.00 to .78 ($M = .45$), indicating that children were performing many actions that had not been specifically discussed by parents. However, there was considerably higher consistency when the relation between what children remembered and what parents discussed was examined more generally. For instance, nearly all of the actions performed by children ($M = .91$) had been discussed more globally by the parents. That is, if children performed an action from the paint picture activity, it was very likely that parents had discussed making the paint picture with the child, even if the specific action had not been discussed. For 10 of the 12 children, there was 100% agreement between behavioral recall of specific actions and general activity information discussed by the parent. However, these findings are considerably less impressive when children's performance is examined in relation to the performance of children who were not reminded about the event. Children in the no reminder condition were as likely to perform the actions as children who had been reminded about them. Also, 10 of the 12 parents in the reminder condition discussed all four of the activities during the reminder sessions,

increasing the likelihood that children would recall information from an activity that had been discussed earlier. Table 3-3 provides an account of the number of children in each group who performed each action at session 3.

A second consistency analysis compared information discussed by children during the verbal reminder sessions and behaviorally recalled at session 3, using the eight children who provided information during the verbal reminder sessions. There was 13% agreement between the actions recalled and the information that children provided during the verbal reminder sessions. Therefore, many of the actions that were behaviorally recalled were not recalled by children during the reminder sessions. Given the earlier finding of the relation between parents' recall and children's performance, it is likely that the information verbally recalled here by children was the same information discussed by parents during those same conversations.

Summary. The results of the analyses with behavioral recall indicate that 24-month-olds can remember a complex novel event for periods of up to 4 months. However, in general, verbal reminders and parental conversational style did not facilitate their recall of this event. Children who were verbally reminded about the event did not evidence better behavioral memory for the event than children who did not receive verbal reminders. Additionally, elaborativeness of parental style during memory talk when children were 24 months did not affect children's behavioral memory for the event, and children having higher vocabularies when the event was experienced did not have better behavioral memory for the event.

Table 3-3
Number (and Proportion) of Children by Group Performing Each Action

Actions Performed												
	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12
Reminder												
Yes	10 (.83)	2 (.17)	8 (.67)	2 (.17)	9 (.75)	11 (.92)	5 (.42)	4 (.33)	1 (.08)	6 (.50)	7 (.58)	12 (1.00)
No	14 (.88)	2 (.13)	12 (.75)	4 (.25)	10 (.63)	13 (.81)	10 (.63)	8 (.50)	0 (.00)	9 (.56)	11 (.69)	16 (1.00)

Note. There were 12 children in the reminder group and 16 children in the no reminder group. Proportions of children in each group responding are in parentheses.

Furthermore, amount of information discussed by parents during the verbal reminder sessions did not facilitate behavioral memory. However, information discussed during these conversations was reflected in behavioral recall. Many of the children performed the same actions or activities that were discussed during these conversations, and only two children performed activities and actions that had not been discussed. However, these results are less impressive when compared to the performance of the no reminder group. Children who were not reminded were as likely to perform as many actions and the same actions as children who were reminded.

Comparison of Groups for Verbal Recall

This section consists of four different sets of analyses: (a) analyses of variance to examine group differences for verbal recall; (b) correlational analyses to examine the relation of language and parental style to verbal recall for all children and for children in the reminder condition; (c) consistency of verbal recall for all children; and (d) consistency of verbal recall with reminded information.

There is evidence from other studies that how parents talk about the past with their children influences how children come to be able to talk about the past themselves (e.g., what types of information they provide and how much information they provide). For instance, more elaborative parents may provide better language models for their children, making it more likely that children will be able to verbalize their memories. To assess the effect of verbal reminders and parental style on children's verbal memory for the event at sessions 2 and 3, children's verbal memory

responses were analyzed in two 2 (Parental style: high elaborative vs. low elaborative) x 2 (Reminder condition: reminder vs. no reminder) between-subjects analyses of variance. For session 2, there were no significant effects of reminder condition (reminder condition: $M = .58$; no reminder condition: $M = .38$) or parental style (high elaborative: $M = .23$; low elaborative: $M = .67$) on children's verbal recall, all $ps > .05$. However, in general, verbal recall at session 2 was low because very few children were able to provide information. Only six children recalled information at this session, and four of these children were in the reminder group.

A second analysis assessed children's memory verbalizations made during behavioral recall at session 3. These verbalizations consisted of anticipatory labelling of actions, activities, and props. Once again, there were no significant effects for reminder condition (reminder condition: $M = .92$; no reminder condition: $M = 1.50$) or parental conversational style (high elaborative: $M = 1.15$; low elaborative: $M = 1.33$) on children's ability to talk about the event, $ps > .05$. These results suggest that children who were verbally reminded about the event were no more likely to verbally recall the event 3 months later than children who were not verbally reminded and that parental elaborativeness did not facilitate verbal memory for the event. See Table 3-4 for the number of memory verbalizations provided by children in session 2 and session 3. Fourteen children verbally recalled information at session 3; six of these children were in the reminder group.

Table 3-4
Memory Verbalizations at Session 2 and Session 3 by Group

	Session 2					
	Elaborativeness					
	High			Low		
Reminder condition	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>
Reminder	0.43	0.54	7	0.80	1.79	5
No reminder	0.00	0.00	6	0.60	1.08	10
	Session 3					
Reminder	1.00	1.29	7	0.80	0.84	5
No reminder	1.33	0.82	6	1.60	3.06	10

Note. The means represent the total number of actions (12 possible), props (17 possible), activities (4 possible), and related information (14 possible) verbally recalled by children about the event.

Overall relation of language and style to verbal recall. Correlations also were used to examine further children's verbal recall for the event. First, there was no relation between parental style and verbal recall at either session 2, $r(26) = -.06$, or

session 3, $r(26) = -.13$, $ps > .05$, indicating that once again, parental elaborativeness did not affect memory for the event.

One possibility that was proposed is that children's ability to talk about an event may be less a function of children's memory for the event than their language abilities. Therefore, it would be expected that children having higher MLUs and vocabularies at 27 months would be better able to express their memories. It was important to address whether children's language abilities when the event was experienced and when they were required to recall the event were related to their ability to verbally recall or talk about the event. As with behavioral recall, the relation between vocabulary at 24 months and vocabulary and MLU at 27 months and verbal recall was examined. The mean vocabulary for children at 24 months was 249 words (range: 9 - 542) and at 27 months was 407 words (range: 31 - 619). By 27 months, the average MLU was 2.47 (range: 1.0 - 4.6), as determined by free play at session 2. There was a significant relation between vocabulary at 24 months and verbal recall at session 2, $r(26) = .57$, $p < .01$. There also were marginally significant relations between vocabulary at 24 months and verbal recall at session 3, $r(26) = .35$, and between vocabulary at 27 months and verbal recall at session 2, $r(26) = .36$, $ps < .10$. However, there was not a significant relation between vocabulary at 27 months and verbal recall at session 3, $r(26) = .19$, $p > .05$, or between children's MLUs at 27 months and their verbal recall at session 2 and at session 3, $ps > .05$. Therefore, vocabulary at the time the event was experienced

predicted children's ability to verbalize about the event at session 2 more than children's vocabulary at the time of recall.

The results indicate that children with higher vocabularies at the time the event was experienced were better able to express their memories verbally to the experimenter (see Bauer & Wewerka, 1995a, for a similar argument). However, it should be noted that, in general, verbal recall at session 2 was very low and did not occur often; only four children in this condition expressed any verbal memory for the event at session 2. In sum, children's language abilities at the time the event was experienced predicted their ability to verbally recall the event 3 months later, but language abilities in the form of MLU and vocabulary at 27 months did not strongly predict verbal recall at that time although all correlations were in the expected direction.

There was also no relation between the amount of information verbally recalled at session 2 and session 3, $r(26) = -.01$, $p > .05$, indicating that children were not responding similarly at both sessions. Correlations also were used to examine the relation between behavioral recall and verbal recall at sessions 2 and 3. First, there was not a strong relation between behavioral recall at session 3 and verbal recall at session 2, $r(26) = .31$, $p > .05$. Also, the relationship between behavioral and verbal recall was not higher for verbal recall at session 3, $r(26) = .19$, $p > .05$. Thus, there was not a strong relation between what children verbally recalled and what they behaviorally recalled, indicating that children were not necessarily recalling the same information about the event over time.

Given that no effects were found for parental style, and other studies have found a positive relation between elaborativeness of the parent and elaborativeness of older children's memory at later points, additional analyses were conducted to account for the discrepancies in findings. One possible explanation concerned the elaboration ratio, which consisted of both an elaboration score and a repetition score. For instance, a parent who was classified as high elaborative could actually have provided many elaborations or only a few, as long as the parent provided at least 50% more elaborations than repetitions. Therefore, it was possible that some high elaborative and low elaborative parents actually provided their children with the same number of elaborations. However, there was no relation between number of elaborations and verbal recall at either session 2, $r(26) = -.07$, or session 3, $r(26) = .08$, $ps > .05$. Similarly, there was no relation between the number of repetitions and verbal recall at either session 2, $r(26) = .04$, or session 3, $r(26) = .14$, $ps > .05$. Therefore, there was very little about the parents' actual style at 24 months (elaborations and repetitions) that predicted children's subsequent verbal recall.

It was also possible that parental style represented nothing more than how the parent talked to the child at that particular point in time and was not representative of a global conversational style characteristic. Given that few studies have examined the relation between parental style and children's event recall in young 2-year-olds, little is known about the relation between the two for children this age. It is possible that although parental style has positive effects for older children, parental style may have little or no effect on children this young. It is also possible that parents of children

this age have not engaged in memory talk often enough to have developed a stable style. To address the possibility that parental elaborativeness was related to a child characteristic, such as language, rather than to the parent, the relation between parental style and child language (vocabulary at 24 and 27 months and MLU at 27 months) was examined.

There were significant negative correlations between parents' style (as determined at session 1) and children's vocabulary at session 1, $r(26) = -.39$, children's vocabulary at session 2, $r(26) = -.50$, and children's MLU at session 2, $r(26) = -.47$, all $ps < .05$. These results suggest that parents who were more elaborative at session 1 also had children who had lower vocabularies at session 1 (i.e., at the time parents and children talked about events) and that these same children continued to have lower language skills than other children 3 to 4 months later. One explanation is that some of the parents of low language children may have compensated for what they perceived to be their children's inability to contribute to the conversation by providing more elaborations and asking fewer questions that requested specific information (i.e., more repetitive parents are typically after specific information and ask the same questions repeatedly in an attempt to get their children to provide that information.). Although the traditional interpretation of parental elaborativeness with older children has not demonstrated this pattern, it is possible that some parents who perceived either that their children were competent language users (i.e., higher vocabularies) or had good memories provided fewer elaborations and

repeated themselves more often, indicating an expectation that their children should be able to answer.

To address the possibility that low elaborative/repetitive parents were asking more questions in general than high elaborative parents, parental style was correlated with the number of questions asked at session 1. Given that elaborations could be questions or statements, high elaborative parents may not only be providing their children with more information, but they may be asking fewer questions. This hypothesis was not supported. First, there was no relation between parental style and the number of questions asked by parents, $r(26) = -.19$, $p > .05$, indicating that high elaborative and low elaborative parents were not asking different numbers of questions. Second, additional analyses also indicated a positive relationship between the number of questions asked and the number of elaborations provided, $r(26) = .57$, and between the number of questions asked and the number of repetitions provided, $r(26) = .66$, $ps < .01$, respectively. Thus, it was not the case that elaborations were less likely to be questions, and high elaborative parents were as likely to ask their children questions as low elaborative parents.

Another possibility was that elaborative parents were asking questions but not waiting for (i.e., expecting) answers or that they answered their own questions more often. To examine whether there were differences in children's ability to respond to parental questions, the number of children's responses to parental questions was examined. Responses were any verbalizations that encouraged parents to continue with the conversation and included memory responses, repetitions, and unintelligible

comments that were not clearly off topic. Analyses revealed no relation between parental style and children's responses, $r(26) = -.04$, $p > .05$; low elaborative parents were not more likely to have children who responded to their questions. Additionally, there was no relation between parental style and children's failure to respond, $r(26) = .02$, $p > .05$; high elaborative parents were not more likely to have children who failed to respond. There was, however, a positive relation between the number of questions asked and the number of children's responses, $r(26) = .84$, $p < .05$; that is, children were likely to respond in some way to their parents' questions that were asked. Therefore, the second hypothesis that high elaborative parents either did not ask their children as many questions or provided more answers themselves in response to what they perceived to be their children's language inadequacies was not supported.

Although the present research did not analyze the types of questions that parents asked their children, one possibility is that these parents asked their children questions that they could answer without needing many language skills (e.g., yes/no questions). Research also has demonstrated that parents ask their children fewer yes/no questions and more open-ended questions as children acquire more verbal skills (Reese & Fivush, 1993). In the present study, parents may have been more elaborative and may have asked easier questions to compensate for their children's low vocabulary and language skills. See Table 3-5 for a summarized account of significant and nonsignificant correlations.

Table 3-5
Summary of Correlations for All Children

	Style	Vocab 1	Vocab 2	MLU 2	Verbal 2	Verbal 3	Behavior	Elabs
Vocab 1	-.39**							
Vocab 2	-.50***	.78***						
MLU 2	-.47**	.58***	.46**					
Verbal 2	-.06	.57***	.36	.27				
Verbal 3	-.13	.35	.19	.32	-.01			
Behavior	-.20	.05	.07	-.01	.31	.19		
Elabs	.42**	-.31	-.39**	-.30	-.07	.08	-.22	
Repets	-.52***	.15	.01	.25	.04	.14	.13	.22

Note. * denotes $p = .05$; ** denotes $p < .05$; *** denotes $p < .01$.

Relation of language and style to verbal recall for the reminder group.

Although there were no significant differences between the reminder and no reminder groups, indicating that verbal reminders did not facilitate verbal memory for the event, it was still possible that repeated conversations about the event affected what information children in the verbal reminder condition recalled (Hudson, 1991b, 1993). Therefore, correlations also were used to examine further whether verbal reminders affected children's verbal recall. These correlations included: (a) correlating children's verbal recall at sessions 2 and 3 with the amount of information discussed by parents during the verbal reminder conversations; (b) correlating children's verbal recall at sessions 2 and 3 with the amount of information discussed by them during the verbal reminder conversations; (c) correlating parental style with verbal recall at sessions 2 and 3; (d) correlating information verbally recalled by children at session 2 and session 3; and (e) correlating amount of information recalled verbally at sessions 2 and 3 with information recalled behaviorally.

To determine whether information discussed by parents during the verbal reminder sessions affected children's verbalizations at sessions 2 and 3, children's verbal recall at each session was correlated with the amount of information discussed by parents during the verbal reminder conversations (parent compilation score). Amount of information discussed did not predict verbal recall at session 2, $r(10) = .24$, $p > .05$, and was not related to verbal recall at session 3, $r(10) = -.04$, $p > .05$. These findings suggest that parental elaborativeness did not affect children's

verbal recall of the event, and that parents who talked about more information did not have children who recalled more information at recall.

To determine whether information discussed by children during the verbal reminder sessions affected their verbalizations at sessions 2 and 3, children's verbal recall at each session was correlated with the amount of information that they recalled during the verbal reminder conversations (child compilation score). First, there was a significant relation between the amount of information that children discussed during the reminder sessions and the amount of information recalled at verbal session 2, $r(10) = .79, p < .05$. There also was a marginally significant relation between children's recall during the reminder sessions and information recalled at verbal recall session 3, $r(10) = .54, p < .10$. Therefore, children's ability to contribute to memory talk about the event during the reminder sessions predicted their ability to recall the event with an experimenter 3 months after experiencing the event.

Because it was originally predicted that children having high elaborative parents would be more likely to have elaborate memories of the event, particularly if they talked about the event over the delay period, parental style also was correlated with verbal recall at the second and third sessions for children in the reminder group. If parental conversational style affects children's recall, children having parents with higher elaborative styles would be expected to verbalize more about the event. Once again, there was no relation between style and verbal recall at session 2, $r(10) = -.08$, or between style and verbal recall at session 3, $r(10) = -.22$, all $ps > .05$, indicating

that children of high elaborative parents who were reminded were not more likely to have better verbal memories of the event than children of low elaborative parents.

Although there also was not a significant relation between verbal recall at session 2 and behavioral recall, $r(10) = .27$, or between behavioral recall and verbal recall at session 3, $r(10) = .37$, $p_s > .05$, all correlations were in the expected direction. Children who verbally recalled the event did not demonstrate superior behavioral memory for the event.

Once again, there was no correlation between the amount of information verbally recalled at session 2 and session 3, $r(10) = .26$; $p > .05$; amount of information recalled at one point did not predict the amount of information recalled at a later point. Therefore, children who talked at session 2 were not more likely to talk at session 3.

In sum, although there was no relation between what was discussed during the sessions and later recall, and elaborativeness of parental style had no effect on children's subsequent memory for the event, children's vocabulary at the time the event was experienced and children's ability to participate in the reminder sessions predicted their memory for the event. See Table 3-6 for an account of the significant and nonsignificant correlations for the reminder group.

Consistency of verbal recall. Consistency of verbal recall was examined for all children to determine relations between information recalled at different time points. First, only three children provided information on both sessions, and only one of them recalled the same information on both sessions. Therefore, verbal recall across

Table 3-6
Summary of Correlations for Children in the Reminder Group

	Style	Vocab 1	Vocab 2	MLU 2	Verbal 2	Verbal 3	Behavior	Elabs
Vocab 1	-.58**							
Vocab 2	-.77***	.84***						
MLU 2	-.57*	.65**	.68**					
Verbal 2	-.08	.57*	.31	.07				
Verbal 3	-.22	.23	.04	-.03	.26			
Behavior	-.21	-.09	-.14	-.37	.27	.37		
Elabs	.74***	-.31	-.52	-.42	-.14	-.07	-.33	
Repets	-.53	.47	.41	.44	-.01	.07	.33	-.24

Note. * denotes $p = .05$; ** denotes $p < .05$; *** denotes $p < .01$.

sessions was very inconsistent, with most of the children who recalled information only providing information at one of the two sessions. For all children, consistency of verbal recall at both sessions to behavioral recall also was assessed. Given that the number of children who verbally recalled information was so low, consistency was only calculated for those 6 children who verbally recalled information at session 2 and those 14 children who verbally recalled information at session 3. Consistency between verbal recall at session 2 and behavioral recall was .11, and consistency between information that was both verbally anticipated at session 3 and also behaviorally recalled was .23. Therefore, only about 25% of the actions performed by those children were verbally anticipated or labeled, indicating that, in general, consistency between verbal and behavioral recall was quite low.

Consistency of verbal recall with reminded information. Consistency measures also were used to examine the relation between information discussed during the verbal reminders and information verbally recalled. To determine whether children were recalling the same information from the event across recall or reminder sessions, consistency of verbal recall was examined: (a) between information provided by the parents over the verbal reminder sessions and children's verbal recall at session 2 and at session 3; (b) between information provided by the child over the verbal reminder sessions and their verbal recall at session 2 and at session 3; and (c) between verbal recall at sessions 2 and 3.

The important question of course was whether information discussed during the reminder sessions was later recalled during verbal recall. First, regarding the

consistency between information provided by the parents and children's verbal recall at session 2, of the four children who verbally recalled information at session 2, 63% of the information verbally recalled at session 2 had been discussed by parents during the verbal reminder sessions. For the six children who verbally recalled information at session 3 during behavioral reenactment, 47% of this information had been discussed by parents during the verbal reminder sessions.

The relation between information provided by children during the verbal reminder sessions and their verbal recall at both recall sessions was also examined. For session 2, 38% of the information verbally recalled by the four children had been recalled by them previously during the recall sessions. For session 3, 17% of the information recalled had been recalled by them previously during the verbal reminder sessions. It is interesting to note that nearly all of the information recalled by children at session 2 had been previously discussed by either themselves, the parent, or both. However, a greater proportion of information recalled by children at session 3 was new information and had not been previously discussed during the verbal reminder sessions.

Finally, the relation between information recalled at session 2 and at session 3 was examined. Only two children provided information at both sessions. One of them provided the same information at both sessions; 20% of this information was the same.

Summary

The results for verbal recall and behavioral recall suggest that verbal reminders and elaborativeness of parental style at the time the event is initially experienced do not facilitate long-term memory for a novel event. Children who received verbal reminders were not more likely to verbalize about the event at either session or to behaviorally reenact the event than children who did not receive verbal reminders. It also was not the case that parents having high elaborative styles had children who were better able to verbalize about the event 3 months later. Vocabulary at 24 months predicted how well children verbalized about the event at session 2 and marginally predicted verbal recall at session 3. However, even when children did verbally recall information about the event, verbal recall at different sessions reflected different information.

For the reminder group, the amount of information discussed by parents during the reminder sessions did not predict how much children verbally or behaviorally recalled. Although what was discussed and recalled during these sessions was strongly related to what children actually recalled later, children who were not reminded performed as many actions and the same actions as children who were reminded. Therefore, the results from the present study provide little evidence that memory talk improves memory for an event in young 2-year-old children.

CHAPTER 4

DISCUSSION

The purpose of this study was to examine the relation between long-term memory and language in 2-year-olds. As an extension to the social construction model, it was proposed that talking about an event could potentially serve several functions for children: (a) it could teach children how to think about memories and why it is important to remember; (b) it could reactivate memory for the event so that the memory remains accessible for longer periods of time, making it easier for children either to independently recall it in the future or to recall it with someone else; and (c) it could model memory talk so that children can better express their memories using the correct labels, temporal order, and descriptions for the more novel components of the event.

Several issues were addressed in the current study. The first issue was whether 2-year-old children benefit from verbal reminders about a novel event. A second issue was whether parental conversational style (i.e., elaborativeness) affects the extent to which 2-year-old children benefit from memory talk. Memory talk about events has been shown to facilitate older preschoolers' memory for events (Nelson, 1992); more specifically the elaborativeness of parental style during memory talk has been shown to affect children's subsequent memories for events. A third issue concerned the relation between children's language skills and their ability to recall and verbalize

about an event. Finding that memory talk benefits 2-year-old children's memory for events that are experienced prior to the development of a functional language system has implications for the development of autobiographical memory and infantile amnesia. For instance, one reason that young children may not be able to retrieve early experienced events may be that those events were never reminded or translated to a more verbal form (Nelson & Ross, 1980; Pillemer & White, 1989).

In general, the results of the present study provide evidence that 24-month-olds can remember a complex novel event for periods of up to 4 months, and that they can verbalize about the event as well as demonstrate behavioral recall. In the present study, half of the children verbalized about the event during reenactment, and all of the children demonstrated some degree of behavioral recall.

Effect of Verbal Reminders on Memory

Two patterns of results were possible regarding verbal reminders. First, if 2-year-old children benefit from memory talk, or verbal reminders, about the target event, the verbal and behavioral memory of children who engaged in memory talk about the event should be superior to that of children who were not reminded about the event. Furthermore, if memory talk actually reinstates the 2-year-olds' memories as it has been proposed to do with older preschoolers (Nelson, 1992), children should remember not just the information that parents recalled but additional information reflecting independent memories of the event. That is, children would be expected to remember information that their parents did not talk about.

However, if verbal reminders do not affect 2-year-old's memory, children in both the reminder and no reminder conditions should perform comparably 3 months later. Such a finding would provide support for Nelson's theory that 2-year-olds cannot use memory talk to reinstate a memory because young children lack the representational abilities necessary to reinstate their memories using the verbal accounts of others. It is worth noting that little work has examined this proposal regarding the relation between children's memories and their representational understanding. Finding that children younger than 3 benefit from verbal reminders in the present study would suggest that children do not need complex representational abilities to benefit from memory talk.

Regarding children's behavioral recall, there was no indication that children who were reminded about the event performed more actions or sequenced the event better than children who were not reminded. Children who were not reminded performed the same types of actions and the same number of actions at behavioral recall as children who had been reminded. The same results were obtained for children's verbal recall. Therefore, 2-year-old children did not appear to benefit from memory talk about the event although certain patterns of responses made by children in the reminder condition indicated that they may have benefited from memory talk about the event. For instance, children who were reminded were highly likely to remember or verbally recall information that had been discussed during the three memory talk conversations. Also, children's behavioral recall matched parents' discussions of activities nearly perfectly, indicating that children were recalling many

of the same activities that parents had discussed. However, because many parents were discussing all of the activities, it was very likely that if children remembered the event, there would be overlap between what parents discussed and what children remembered.

There was also no indication that verbal reminders increased children's verbal recall of the event. Children who were reminded about the event did not provide significantly more information about the event at either recall session than children who were not reminded. Also, children who verbally recalled information at session 2 were not more likely to verbally recall information at session 3. Only three children recalled information at both sessions, and two of these children were in the verbal reminder condition. Additionally, it was not the case that children behaviorally recalled information that they had previously recalled verbally.

Effect of Parental Style on Memory

A second objective of the present study was to determine whether parental conversational style affected children's memory for the event or affected the extent to which children benefited from verbal reminders. Therefore, it was important to examine whether children's ability to benefit from memory talk was contingent on the elaborativeness of memory talk. There is evidence that how parents talk about the past with their children influences how children come to be able to think and talk about the past themselves (e.g., what types of information they provide and how much information they provide). One idea was that more elaborative parents provide better language models for their children. Children of high elaborative parents were

expected to provide more information verbally than children of low elaborative parents, given that they would have experienced a better model of how to think and talk about event memories, in general.

Regarding children's behavioral recall, there was no indication that children of more elaborative parents performed more actions or sequenced the event better than children of low elaborative parents. There were no differences between the groups whether parental style was examined as a dichotomous variable or as a continuous variable. Therefore, it was not the case that parents who have high elaboration ratios as determined at session 1 were more likely to have children who had better memories for the event. It was also not the case that children in the reminder condition who had high elaborative parents had better memories for the event. The same patterns held for verbal recall; parental style did not predict verbal recall at session 2 or at session 3. There was no relation between parental elaborativeness and later memory for the event.

Effect of Language Abilities on Memory

A third objective was to determine whether children's ability to recall and verbalize about an event is related to the amount of experience that they have had verbalizing about it and to their current language and narrative abilities. If children simply have difficulty expressing themselves because they have not talked about a specific experience, talking about the event with the parent should help them formulate ways to verbally express their memories and increase the likelihood that the more

novel aspects of the event would be reported or that verbal recall would correspond to behavioral recall.

Although verbal reminders and parental style as a whole did not predict children's memory for the event, there was some evidence that children's language abilities was an important determinant of children's memory for the event. Specifically, children's vocabulary at 24 months predicted their ability to verbalize about the event 3 months later. Children with higher vocabularies when the event was initially experienced were more likely to verbalize about the event at session 2 and session 3. In the present study, the child who had the highest vocabulary at 24 months verbalized the most about the event at both sessions and provided the same information. These results partially corroborate those of Bauer and Wewerka (1995a, 1995b) in that they also found that vocabulary at the time the event was experienced predicted children's ability to verbalize about the event at a later time. However, in the present study, vocabulary did not significantly predict children's memory verbalizations during reenactment, possibly because many of the children talked during reenactment regardless of their initial vocabulary. Talking about an event when there is contextual support is less difficult for children than talking about an event when there is no contextual support. Research with young preschoolers also indicates that verbal recall is poorer when there is no contextual support or little contextual support (Farrar & Goodman, 1992). In the present study, one possibility is that children who could "verbally elaborate" on the event at the time it was experienced were better able to express their memories verbally to the experimenter. This is an important finding

because it suggests that the ability to verbalize about an event when it is first experienced has an effect on subsequent memory for the event. Such a finding could potentially explain why memories from certain time periods are more difficult for children to verbalize about than others.

However, it should be noted that, in general, verbal recall at session 2 was very low and did not occur often; only four children in this condition expressed any verbal memory for the event at session 2. Interestingly, language abilities at 27 months (vocabulary and MLU) predict children's ability to verbalize about the event less well. Therefore, there was little support for the idea that the ability to verbalize about an event is related to the children's current narrative abilities. Children who were more verbal at the time of recall were not always more likely to verbalize about the event.

Explanation of Results

There are several possible explanations for why children did not benefit from verbal reminders and for why parental elaborativeness did not affect memory or verbalizations about the event. First, one explanation is that children need to be able to contribute to these conversations before they can use them to facilitate recall. This explanation necessitates a bidirectional effect. It may not be sufficient for children to simply listen to what others are telling them about an experience; rather, they may need to play a more active role in these conversations. Few children made memory responses during the verbal reminder sessions, and those who did provided only about one piece of information on average.

Given that very little is known about the time-dependent nature of verbal reminders, it may also be the case that verbal reminders were not effective for these children because the event either was not discussed enough or was discussed too often or too soon after the event was experienced. Research examining physical reminders suggests that a reminder is most effective when it is presented close to the point that the event would most likely have been forgotten (Rovee-Collier & Hayne, 1987). Because little is known about how verbal reminders work in children, a 1-month interval may not have been effective. Only future research will be able to address this possibility.

Other explanations for the lack of effects for parental style and memory talk include individual differences in memory, language abilities, and motivation. For instance, although some children evidenced good memory for the event and found the event very entertaining, other children were either uninterested in participating or failed to perform the actions correctly. Within the reminder group, one-fourth of the children performed fewer than 4 of the 12 actions; however, it was not the case that they were not using the props, only that they were not using them in the correct manner. Some of the children, then, may have been unmotivated to use the props the way the experimenter had demonstrated previously. For others, the event may not have been distinctive enough to distinguish it from other types of arts and crafts activities that they engaged in at school, although parents were interviewed about their children's activities and the typical activities of 2-year-olds in day care.

Implications for Children's Memory

The results from the current study suggest that young 2-year-old children do not benefit from verbal reminders about an event, and more specifically, that verbal reminders do not act to reinstate memory for events in children this young. Although the current study did not provide direct evidence that the inability to benefit from verbal reminders was the result of representational deficits, as proposed in Nelson (1992), this is a possibility. Changes in children's understanding of mental representation are compatible with Nelson's (1992) views on the development of the ability to use verbal reminders to reinstate memory. She argues that children cannot use language to reinstate memory when they first begin to talk about past events with others because they lack the facility with language needed to use another person's verbal account of the event to set up a representation of their own. The ability to use language as a representational tool makes it possible to exchange representations with others and to compare one's own representations with those of other people. Prior to age 4, she argues that talking about the past with others may only be useful to organize information rather than to reinstate memories.

Other researchers, such as Hudson (1993), argue that what is necessary to benefit from memory talk about an event is the ability to participate more fully in these conversations and to direct their own memory searches. If this is the case, memory talk should begin to reinstate children's memories for events between the ages of 2 and 3 years.

The age at which children can use memory talk to reinstate their memories for events has great relevance for the development of the autobiographical memory system and for the subsequent decline of infantile amnesia. Prior to the formation of autobiographical memory, it is claimed that memories for specific events persist only for periods of days, weeks, or months. However, with the advent of the autobiographical memory system, memories are organized and interpreted in relation to their importance to the self (Fivush & Reese, 1992; Nelson, 1992). Memory talk is useful for the interpretation of events in relation to the self and for the reinstatement of memories, which serves to safeguard important memories against forgetting. Without memory talk and reinstatement, many memories are subject to forgetting over time and are not retained across the lifespan. Finding that memory talk reinstates memories for events in children younger than 3 or 4 would suggest that durable, long lasting memories can be formed prior to the development of the autobiographical memory system or that the autobiographical memory system is functional at this time.

Future Directions

Future research will need to address the age at which verbal reminders, or memory talk, become effective at reminding children about events and increasing the stability and duration of memories. Although verbal reminders do not appear to have facilitated memory for the picture making event, it is possible that more naturalistic types of events may be more conducive for reinstatement.

Also, future research needs to examine whether children's ability to benefit from verbal reminders is related to the development of certain representational abilities

as Nelson has proposed. Some of the representational abilities that have been proposed to be necessary are experiential awareness (knowing that an event was personally experienced), an understanding of informational access (how you know something), and an understanding of the mental state of remembering (Welch-Ross, in press). Work in progress by Boyer and Welch-Ross is further examining the relation between verbal reminders (how often the event was discussed and what is discussed) and memory for a naturally occurring event in 2.5- to 5.5-year-old children. This research also addresses (a) whether children who talk more during the delay period have better verbal memory for the event; (b) whether there is a relation between what is discussed and what is verbally recalled by the children 1 or 6 weeks later; and (c) whether there is a relation between metacognitive abilities and memory for the event and metacognitive abilities and the ability to use verbal reminders to reinstate memory.

Future research also needs to examine the relation between parental style and child factors. For instance, research has demonstrated that parental elaborativeness predicts elaborativeness of children's recall over time. Past research has also demonstrated that over time, parents become increasingly elaborative as their children become better able to engage in conversations about the event and contribute more to the conversations. Additionally, parents change from asking primarily yes-no questions that require children's participation but little verbal ability to asking an increasing number of questions that require more elaborate answers. In the present study, there was little evidence that parental elaborativeness was related to children's

memory at a later point, and there was little evidence that high elaborative parents were elaborative because their children were better able to take part in the conversations about events that were discussed. Rather in the current study, parents who were the most elaborative had children who were the least verbal at that point and who continued to have lower verbal abilities 3 to 4 months later.

One possibility is that parental style at 24 months was an artifact of the testing situation. More work needs to examine the stability of parental style across the preschool period. For instance, it is unknown whether the parental style of parents of children who are nonverbal or transitional (as in the current study) is related to their parental style when their children can contribute information about the event. In the current study, very few children contributed two unique pieces of information during each event conversation as is the required criterion of other researchers to establish a conversation. In some cases, these conversations did not resemble the turn-taking dyadic structures that are characteristic of memory talk conversations by children who are older preschool age. Because children in the current study were not actively contributing information, parents may have resorted to asking a greater number of yes-no questions and to providing a greater number of elaborations in a question format. Although unrelated to style differences, many parents asked their children questions without waiting for a response or used question-like intonations at the end of statements about the event, as if they were either asking for affirmation or trying to keep their children's attention.

Whereas some longitudinal research with preschoolers has examined the stability of parental style, research with children younger than 2.5 has been scarce and has primarily focused on children's memories for the same events over time (with the exception of Hudson, 1991b, 1993; Eisenberg, 1985). For instance, Hudson (1991b) examined the effect of repeated conversations on one 2-year-old child's event memory. Eisenberg (1985) also examined two 2-year-old children's memory for events over a 1 year period of time. However, neither study examined the effects of parental conversational style on children's memory.

In a second study, Hudson (1993) investigated the effects of parental style and repeated memory conversations on 24- to 30-month-old children's memory for events. Mothers and children were instructed to discuss the same events once a week for 4 weeks. She found that children of high elaborative parents verbally recalled more information about the events than children of low elaborative parents and thus concluded that effects of parental style are apparent as early the second year of life. However, this research did not address the stability of parental style over time. Therefore, additional research needs to examine how parental style changes as children become more verbal and how early style differences are related to children's developing memory for events.

Given that the stability between early parental style and later parental style is unknown, future research also will need to address the possibility that parental expectations or beliefs about children's ability to participate in such conversations motivated their parental style at 24 months. In the current study, parents who were

the most elaborative had children with the lowest verbal abilities according to parent-report. Although there was nothing about these conversations to suggest that parents were adjusting or fine-tuning their style while talking to their children, it is very likely that high elaborative parents were more elaborative as a result of their perceptions of their children's linguistic inadequacies. Although these children were the least verbal of all children in the sample, they were not less likely to respond to their parents' questions, and parents of these children were not less likely to ask their children questions, when compared to the mean number of questions asked by other parents. Therefore, high elaborative parents were asking their children questions that they could answer. Future research will need to address parental beliefs about children's memory and their verbal abilities to determine if parents who perceive their children to be less capable of participating in a conversation with them are more likely to fine-tune their conversations with their children (see also Eisenberg, 1985). Examination of parental beliefs should also assess how often the parents are engaging in conversations with children at this age about past events, and their attitudes about the importance of memory talk. Additionally, memory conversations should be assessed in other settings, possibly in the home where children may feel more comfortable talking with the parent and may be more willing to cooperate.

One limitation of the current study was that it was not possible to determine if the verbal and behavioral recall of children in the verbal reminder condition was due to the verbal reminders. Although consistency was impressive, children who were not reminded performed as many actions and sequenced the actions within the four

activities as well as children who were reminded. To get a better idea of the effectiveness of reminders, future research will need to examine whether information that was discussed was more likely to be remembered by children in the reminder condition. One way that this could be examined would be to instruct parents only to discuss certain aspects of the event and then (a) to assess whether that information was better remembered by those children than information not discussed, and (b) whether children who were reminded were more likely to remember that information than children who were not reminded about that information.

Although there was substantial consistency between what children recalled about the event and information discussed during the reminder sessions, this was attributable to the fact that 10 of 12 of the parents in the reminder condition talked about all four activities. Therefore, if parents are discussing most aspects of the event with their children, there has to be some overlap between what is reminded and what is recalled.

Summary

In conclusion, there was little support for the predictions made regarding the relation between language and memory. First, there was little evidence that verbal reminders affected 2-year-olds' memory for a novel event. Children who were reminded did not verbalize more about the event or perform more actions. Although reminders may have influenced what children remembered, there was no evidence that the conversations were reinstating memory because children recalled very little information that had not been discussed. However, it should not be concluded that

children were evidencing rote memory because parents talked about many aspects of the event and thus there was likely to be some consistency.

Second, although some parents were more elaborative than others, it was not the case that children who had more elaborative parents had better memory for the event or that children of more elaborative parents who were reminded about the event were better able to verbalize about the event. If anything, parental elaborativeness of talk at 24 months seemed to be based on parents' perceptions of their children's linguistic abilities. For instance, children who had the lowest vocabularies at 24 months also had the parents who had the most elaborative styles. Therefore, there was little evidence that parental style affected children's memory for a particular event.

Third, there was some evidence that children's language abilities were related to their verbal memory for the event. Children's vocabulary at the time the event was initially experienced predicted their ability to verbalize about the event (see also Bauer & Wewerka, 1995a, 1995b). Thus, there is some evidence that children's language skills may affect how the event is encoded and stored, such that children who are better able to "verbally elaborate" or verbally encode information about the event when it is first experienced are more likely to verbalize about it at a later point. However, there was less evidence that children's language abilities at the time of recall predicted their ability to verbalize about the event or that children who were reminded about the event had better verbal memories for the event (Hudson, 1990; Mandler, 1990).

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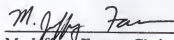
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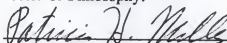
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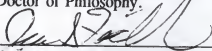
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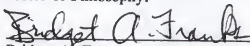
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